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VALLEY FORGE AREA WASTEWATER TREATMENT FACILITY, CHESTERCOUNTY, PENNSYLVANIA

Environmental Protection Agency
Philadelphia, Pennsylvania

September 1974

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The proposed action involves Federal financial assistance for the construction of an eight million gallon per day (mgd) wastewater treatment facility and associated elements of a sewage collection system. Various municipalities participating in the Valley Forge Area Wastewater Treatment Project have applied to EPA via construction grant applications for financial aid in constructing portions of the project. The municipalities consist of: Charlestown, East Pikeland, Schuylkill, Tredyffrin, Willistown, East Whiteland and Easttown Townships and Malvern Borough, all of which are located in Chester County, Pennsylvania. Minor short-term adverse impacts are anticipated during initial construction of the facilities. These construction-associated impacts will result in increased noise levels, disruption of traffic, inconvenience to residents, siltation of streams, disruption to wildlife habitats and slight decreases in ambient air quality in areas proximate to construction. Portions of this document are not fully legible.

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DIRECT QUESTIONS RESULTING FROM ILLEGIBILITY TO:

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PB 236 325

FINAL

ENVIRONMENTAL IMPACT STATEMENT

VALLEY FORGE AREA WASTEWATER TREATMENT FACILITY

CHESTER COUNTY, PENNSYLVANIA

Prepared by

ENVIRONMENTAL PROTECTION AGENCY
REGION III
PHILADELPHIA, PENNSYLVANIA 19106

Approved by:

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SUMMARY

( ) Draft Environmental Impact Statement
(X) Final Environmental Impact Statement

U.S. Environmental Protection Agency
Region III
Philadelphia, Pennsylvania

1. Name of Action

Administrative (X)

Legislative ( )

2. The proposed action involves Federal financial assistance for the construction of an 8 million gallon per day (mgd) wastewater treatment facility and associated elements of a sewage collection system as dictated under the statutory authority of P.L. 92-500, the Federal Water Pollution Control Act Amendments of 1972 (FWPCA). Various municipalities participating in the Valley Forge Area Wastewater Treatment Project have applied to EPA via construction grant applications for financial aid in constructing portions of the project. The municipalities consist of: Charlestown, East Pikeland, Schuylkill, Tredyffrin, Willistown, East Whiteland and Easttown Townships and Malvern Borough, all of which are located in Chester County, Pennsylvania.

The original construction grant applications submitted by the participating municipalities did not include the collection system for this project since collector sewers were not eligible under the construction grant program at the time the original applications were submitted.

When FWPCA was enacted on October 18, 1972, it expanded eligibility to include collector sewers. Subsequently, each participating municipality in February,1973 submitted applications to the Pennsylvania Department of Environmental Resources (DER) covering collector sewers for the project. On August 12, 1974, DER submitted to EPA its most recent project priority list which included these collection systems as fundable projects. The final priority list has not been approved by EPA, pending EPA's review of the priority list and the testimony presented at the public hearing on the list held by DER on June 21, 1974. Assuming approval of a final priority list by EPA and the subsequent forwarding by DER to EPA of certified applications for the subject collection systems, EPA would be in a position to extend grant offers for 75% of the eligible project costs for those collector sewers which will serve communities which were in existence on October 18, 1972.

Assuming the certification process for these collection sewer grants is favorable, the grant offers for the collectors will be contingent upon normal administrative and technical review and approval of this project as discussed in this Final Environmental Impact Statement (EIS).

Consequently, this EIS reflects new cost figures (user charges, construction costs, etc.) based on estimated eligible costs for the collection sewer grants in addition to the original grants.

As of August, 1974, the applicants' consulting engineers estimated the total project costs associated with this proposed project by individual authority to be:

Valley Forge Sewer Authority -	$17,893,534
Tredyffrin Township Municipal Authority -	17,579,960
Willistown Township Municipal Authority -	5,315,000
East Whiteland Municipal Authority -	3,395,000
Malvern Municipal Authority -	1,697,000
Easttown Municipal Authority -	9,508,000
TOTAL	$55,388,494

3. The proposed facilities have been designed to meet the wastewater treatment needs for the areas delineated by the dotted blue line on Plate 2 (Design Service Area) as projected to the year 1985. The proposed wastewater treatment facilities are designed to alleviate a public health hazard, improve water quality and permit orderly growth patterns in the project area.

Minor short-term adverse impacts are anticipated during initial construction of the facilities. These construction-associated impacts will result in increased noise levels, disruption of traffic, inconvenience to residents, siltation of streams, disruption to wildlife habitats and slight decreases in ambient air quality in areas proximate to construction. However, these impacts will be minimized through sound conservation practices and contemporary construction techniques.

Environmentally protective measures, recommended or required by EPA Region III and described in detail in this EIS, will result in the mitigation of long-term secondary adverse impacts. The thrust of Region III's efforts in concert with DER has been directed to the preservation of environmental quality as it directly relates to the secondary impacts on land use, socioeconomic parameters and air and water quality. To this end, EPA has conducted studies for the purpose of analyzing the current status of each municipality's land use planning, comprehensive planning and local ordinances, and pointing out areas of environmental sensitivity which require the protection of strong local ordinances (existing and revised) while controlled development (utilizing the guidance set forth in this EIS) proceeds. As a result of continued concern by Malvern Borough's officials over that community's spring/well water supply system, EPA thoroughly investigated the situation to determine the degree of impact the sewer system would have on the spring and well yields.

Section VI and Appendix A of this EIS respectively describe the conclusions and recommendations arrived at by EPA after thoroughly conducting the studies mentioned previously and those supplemental requirements made part of the grant agreements which are to be complied with by the applicants.

This EIS points out that if the recommendations and requirements of Region III are adopted and reflected in revised land use and sewer plans, the result will ensure that the provision of sewer service in the communities can be economically provided without exorbitant annual sewer rentals, while maintaining air and water quality.

4. Numerous alternatives have been evaluated based on environmental and economic considerations. Alternative evaluations vary from individual treatment processes to sewer line locations. Processes such as incineration, landfilling, landspreading and spray irrigation have been evaluated. In addition, alternative system designs have been analyzed in detail, including two and three plant designs.

Land use alternatives have been discussed to describe the effects of a no-action plan, as well as the project's impacts on the basis of existing land use patterns and an environmentally sensitive plan.

5. The following three pages contain a list of all Federal, state and local agencies, environmental groups and citizens from which written comments on the Draft EIS have been received.

6. The Draft EIS was made available to the Council on Environmental Quality (CEQ) and the public in December, 1972. This Final EIS will be made available to CEQ and the public in September, 1974.

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INTRODUCTION

On October 18, 1972, the Federal Water Pollution Control Act Amendments (FWPCA) became Public Law 92-500.* The new law created a program based on three major elements: uniform nation-wide standards, enforceable regulations and a permit program based on effluent limits and geared to specific goals.

The primary aim of the Act was to "restore and maintain the chemical, physical and biological integrity of the Nation's waters." By July,1983, wherever possible, water quality was to be suitable for recreational contact and for protection and propagation of fish and wildlife. To achieve these objectives, the Act established a national goal that discharges of pollutants be eliminated by 1985. However, the Act did not make the 1985 goal a legally binding requirement. In addition, the Act emphasized the special need for controlling or eliminating discharges of toxic pollutants.

These national goals are being implemented by two programs. The first is an expanded system of Federal grants to plan and construct publicly owned waste treatment plants. Second, a permit program has been established to restrict pollutant discharges from point sources -- i.e., factories, municipalities and large agricultural operations where pollutants enter the Nation's waters through an outfall pipe, sewer or other conduit.

The law created a new system to limit discharges of all pollutants from point sources. These minimum limits are set in two steps by EPA based upon the availability of proven pollution control technology. Different limitations apply to municipal treatment plants and industries, and both are required to meet increasingly stringent limitations by the 1977 and 1983 deadlines set in the Act. EPA also sets National Standards of Performance to limit effluents from newly constructed facilities, sets pretreatment standards to be used by industries that discharge their wastes into municipal treatment plants, and sets toxic effluent standards for sources that discharge toxic pollutants.

The water quality standards program includes intrastate standards as well as those for interstate waters. Existing standards are being revised to tie in closely with the major goals and deadlines in the Act. All water quality standards provide a yardstick to measure the effectiveness of effluent limitations. Where limitations are inadequate to protect high quality bodies of water, EPA prescribes more stringent limitations.

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*The following statement is drawn from "A Citizen's Guide to Clean Water," prepared by the Izaak Walton League of America under contract with the U.S. Environmental Protection Agency. Copies of this 94 page report may be obtained from EPA, Region III, on request.

Standards under the Act represent goals to be achieved and maintained. The main mechanisms for meeting these standards are the permit program and the Act's planning processes.

The National Pollutant Discharge Elimination System (NDPES) is the major mechanism to regulate discharges from point sources. All such sources must obtain a permit from EPA or from a state if it has a Federally approved NPDES program. These permits contain compliance schedules requiring the source to reduce pollutants step-by-step over a specified period of time. Sources also must monitor and report their discharges on a continuing basis.

One of the major systems of planning (the others are area-wide, state and regional) mandated under the Act to clarify Federal, state and local roles in planning and management is municipal planning performed by individual municipalities or groups of municipalities as in the case of the Valley Forge Area. This local municipal planning is directly related to the building of publicly owned treatment works. Municipal facilities plans must provide ways to prevent, dispose and store wastes and must consider alternatives other than conventional structural facilities to reduce municipal wastes.

Under the statutory authority of P.L. 92-500, EPA is charged with administering these programs.

The Environmental Impact Statement (EIS) has been prepared pursuant to P.L. 91-190, the National Environmental Policy Act of 1969 (NEPA), and Executive Order 11514 entitled "Protection and Enhancement of Environmental Quality", dated March 5, 1970. Both NEPA and Executive Order 11514 require that all Federal agencies prepare such statements in connection with their proposals for major Federal actions significantly affecting the quality of the human environment.

This EIS has been prepared in accordance with the regulations and guidance set forth in the CEQ Guidelines dated August 1, 1973, and EPA's Interim Regulations, 40 CFR-Part 6, dated January 17, 1973, both covering the preparation of environmental impact statements. For the purposes of this Environmental Impact Statement, EPA, Region III, Philadelphia, Pennsylvania, is the "Responsible Federal Agency" as required by NEPA.

This EIS has been prepared on the proposed project as it was submitted to EPA by the applicants, and is based on currently available data and information. The purpose of the EIS is to give meaningful consideration to the environmental issues involved rather than as a justification for decisions already made. This EIS does not dictate the ultimate solution to water quality management for the area. Pollution abatement is a continuous endeavor where Federal, state, county and local governments all have responsibilities to achieve and maintain the water quality goals mandated by Federal and state laws.

In accordance with the CEQ Guidelines, this EIS examines the relationship of the proposed action to land use plans, policies and controls of the affected area. This report also presents the population and growth assumptions used to support the project and to determine secondary population and growth impacts resulting from the proposed action and its alternatives.

The EIS also addresses issues of how the proposed project will conform or conflict with the objectives of approved or proposed Federal, state and local land use plans, policies and controls, and describes the extent to which EPA has reconciled the proposed action with these plans, policies or controls.

This EIS evaluates the positive and negative impacts of the project on the environment, including the primary or direct consequences as well as the secondary or indirect consequences. These latter include, in the case of construction of sewer systems, the stimulation or inducement of secondary effects in the form of associated investments and changed patterns of social and economic activities as well as impacts on growth and population. This EIS assesses these possible changes in population patterns or growth upon the resource base, including land use, water, air and public services of the area involved.

Despite the fact that some alternatives for wastewater treatment and various identifiable environmental impacts (primary and secondary) may fall outside the explicit regulatory and enforcement authority of EPA, NEPA mandates a full public disclosure of all reasonable alternatives and possible environmental impacts. This disclosure and discussion is the intent of this EIS. Since EPA does not have the direct authority to limit land development or dictate the type of land development, the discussion of secondary effects is presented in order that state, county and local governments may evaluate their related pollution problems to insure that environmentally sound solutions for minimizing the future environmental impacts of urban development are ultimately adopted.

To insure that the public is kept fully informed regarding this action, and that it participates to the fullest extent possible in EPA's decision making process, this EIS is being circulated for a 30-day review as required by CEQ's August 1, guidelines. In addition, as discussed at greater length in Sections III and VI, public participation in the land use planning activities being engaged in by the participating municipalities has been mandated by EPA.

I. BACKGROUND

A. Location and Identification of Study Areas

Area limits have been chosen for the purpose of discussion and clarity throughout the EIS. These area boundaries have been delineated by the grantees and approved by EPA. Various sections in the EIS will be addressed in reference to certain defined areas so that the discussions are more confined and more easily followed by the reviewer.

For this project, the area limits are:

1. Middle Atlantic Region - Figure I-1 indicates the location of the Valley Forge project in relation to the major rivers of the Middle Atlantic Region. The proposed project is situated in the Delaware River Basin drainage area, which is under the jurisdiction of the Delaware River Basin Commission. The DRBC and DVRPC, representing the major regional planning agencies and the Chester County Planning Commission have jurisdiction which encompasses the entire Valley Forge Area Wastewater Treatment Project.

2. Peripheral Study Area - The Peripheral Study Area is a general term used to describe the surrounding areas within the Pennsylvania portion of the Philadelphia metropolitan area which bear directly on the design of the wastewater treatment facilities for the area.

3. Study Area - The Study Area (defined in the Draft EIS as the "Potentially Serviceable Area") is the geographic area defined by natural drainage basins which are the functional land management units in planning for wastewater collection and conveyance. The Study Area, which is entirely within Chester County, is shown on Plate 1 and is based on the drainage basins shown in Plate 5 and Figure I-2.

4. Statistical Study Area - The Statistical Study Area includes all municipalities totally or partially included in the Study Area in their entirety. In addition to the eight participating municipalities, the Statistical Study Area also includes East Vincent, Phoenixville, West Pikeland and West Vincent. This area definition is used to facilitate the use of census data.

5. Design Service Area - The Design Service Area for the proposed project is the area to which service will be extended by 1985, the design year of the project. As such, the design concept for this area determines the strategic location of interceptors, force mains, pumping stations and the treatment plant.

6. Initial Service Area - The Initial Service Area is essentially the land area containing the most severe health hazards and activities which are degrading water quality in the Study Area. Service for this critical area constitutes phase one in the program. Provision is also made in the Initial Service Area design to locate collector and interceptor lines to provide access and capacity to serve the remaining undeveloped areas in the Initial Service Area as they are developed.

B. Existing Wastewater Treatment Facilities

A number of existing treatment facilities are located within or border the Peripheral Study Area. These include industrial, institutional, commercial, domestic waste package plants and municipal treatment plants. Shown on Plate 4, "Existing Sewage Facilities", are the locations of the existing municipal treatment plants, as well as other type plants within the service areas.

The plants of primary interest nearly contiguous to the Study Area are:

Spring City Sewer Authority Plant
Borough of Phoenixville Plant
Montgomery County Sewer Authority Oaks Plant
Devon Drainage Association Plant
Upper Merion Township Trout Run Plant
Radnor-Haverford-Marple Plant (located in the Delaware River Watershed south of the Study Area)

Based on latest information, the Spring City Sewer Authority currently operates a 0.346 mgd sewage treatment plant, located on the south bank of the Schuylkill River. Although the plant serves an estimated population of 3,600, its actual flow is 0.407 mgd, causing it to be overloaded. A report prepared for Spring City in 1965 recommended expansion of the facility to handle the increased loadings, and DER has indicated that Spring City will be applying for federal funds in Fiscal Year 1975 in order to provide such expansion.

The Borough of Phoenixville sewage treatment plant is of the activated sludge type and has a design capacity of 4.0 mgd. At present the plant receives approximately 1.86 mgd and has a connected population of about 17,000 persons covering the service area as outlined on Plate 4. The plant is located on and discharges treated effluent to the Schuylkill River. The Borough has stated that the unused capacity will be necessary to handle increased loads within its serviceable area. (See Subsection C, "Brief History of the Proposed Project and Grant Applications" for a more extensive discussion of the Phoenixville Plant.)

The Montgomery County Sewer Authority proposed to expand its Oaks wastewater treatment plant from the existing capacity of 2.0 mgd to 10.0 mgd. The site is located approximately one mile southwest of the Montgomery County community of Oaks, on the north corner of the confluence of the Perkiomen Creek and Schuylkill River. Using the extended aeration process, the existing plant achieves removal efficiencies of 89% suspended solids, 94% BOD_5, 55% NH_4 -N and 13% PO_4*. According to 1972 data, the plant is overloaded hydraulically (2.33 mgd) but still underloaded organically. Since the plant is still achieving satisfactory removal efficiencies, DER has not placed connection bans on the system. Service is extended at present to include the Townships of Lower Providence, Skippack, Upper Providence and Perkiomen and the Boroughs of Collegeville and Trappe. The potential service area for the Oaks Plant, if expanded, will include parts of Limerick and Worcester Townships and Royersford Borough.

Latest information indicates that the Easttown-Devon sewage treatment plant is of the extended - aeration type with a design capacity of 0.16 mgd and a design connected population of 1,600 persons. Approximately 775 persons are now connected to the plant, but because of high infiltration, the plant now is receiving flows of 0.18 mgd and is in need of expansion. Currently, the plant is under infiltration orders. The treatment plant is located in the Devon area of Easttown Township on the east bank of a minor tributary to Darby Creek, about 1,000 feet north of Sugartown Road. The service area is outlined on Plate 4.

The northeastern section of Tredyffrin Township and northern section of Easttown Township, lying in the Trout Run Drainage Basin, is currently sewered. Sewage is conveyed from these areas to the Upper Merion Trout Run sewage treatment plant, which is located near the Schuylkill River. The existing service area, with a service population of 40,000, is shown on Plate 4. The existing plant is of the trickling filter type and has a design capacity of 5 mgd. Currently, flows to the plant are near design capacity. (See Subsection C, "Brief History of the Proposed Project and Grant Applications" for a further discussion of the Trout Run Plant.)

Sewage from the southeastern portion of Tredyffrin Township is conveyed to the Radnor-Haverford-Marple sewage treatment plant in Delaware County. The plant's capacity is 5.4 mgd and current flows average 4.0 mgd. In accordance with the Delaware County Regional Water Quality Control Authority (DELCORA), the Darby Creek Bypass (Phase I), to be completed in October, 1975, will affect the phase out of the Radnor-Haverford-Marple treatment plant. The

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*BOD_5 = Five day biochemical oxygen demand
NH_4-N = Ammonia-Nitrogen (makes up part of Nitrogenous BOD)
PO_4 = Phosphate

Darby Creek Joint Authority plant will continue to treat 10 mgd while the Southwest Philadelphia plant treats 16.5 million gallons a day. Upon the completion of Phase II, scheduled for December, 1977, these two plants will be phased out and all wastewaters will go to Philadelphia for treatment.

Tables showing known industrial, commercial and institutional treatment plants and known interim municipal sewage treatment plants in the Study Area are presented in the discussion of Water Quality. This latter information was obtained from DER's files and the Chester County Master Sewer Plan - Revised Edition 1970.

The industrial plants in the Design Service Area will either be phased out or used as pretreatment facilities in order that wastewaters discharged to the system comply with the Federal and state standards regarding the quality of industrial wastes defined in regulations based on FWPCA. All the interim municipal plants in the Design Service Area will be phased out of operation as soon as practical.

C. Brief History of the Proposed Project and Grant Applications

The proposed project is designed to provide sewage facilities for portions of northeastern Chester County. These facilities will include collector sewers, interceptors, pumping stations, force mains and a wastewater treatment plant to be located on the west bank of the Schuylkill River near its confluence with Perkiomen Creek.

The communities proposing to construct sewage facilities that will become a part of this project, and their technical representatives, are presented in Table I-1.

In accordance with the laws of the Commonwealth of Pennsylvania, each authority was created and its members appointed by locally elected township supervisors and borough councils to investigate the needs for municipal services such as sewage; retain professional services to assist in planning and design; accomplish the financing and construction of the projects; and, in the instance of operating authorities such as the Valley Forge Sewer Authority, provide for the continuing management and operation of constructed facilities.

During the early planning phases, it first appeared that it might be feasible for the municipalities in the Valley Creek Drainage Basin to be serviced by the Upper Merion Trout Run Plant,

TABLE I-1

COMMUNITIES INVOLVED IN PROPOSED ACTION

Community	Responsible Body	Current Representative and Title	Consulting Engineer
Tredyffrin Township	Tredyffrin Twp. Municipal Authority	John Woodcock Authority Chairman	Gannett Fleming Corddry & Carpenter
East Whiteland Township	East Whiteland Twp. Municipal Authority	John Haines Authority Chairman	Roy F. Weston
Willistown Township	Willistown Twp. Municipal Authority	William O. Reeside Authority Chairman	George F. Mebus
Easttown Township	Easttown Twp. Municipal Authority	Ronald F. Harper Authority Chairman	John Yerkes
Malvern Borough	Malvern Municipal Authority	George N. Highley Authority Chairman	Roy F. Weston
Schuylkill Township	Valley Forge Sewer Authority	Dr. Joe Weinstock Authority Chairman	Buchart-Horn
Charlestown Township	Valley Forge Sewer Authority	Dr. Joe Weinstock Authority Chairman	Buchart-Horn
East Pikeland Township	Valley Forge Sewer Authority	Dr. Joe Weinstock Authority Chairman	Buchart-Horn

and those in the French and Pickering Basins at an expanded Phoenixville Plant. However, repeated efforts by these Chester County municipalities to negotiate agreements with either Upper Merion Township or Phoenixville Borough to tie into their existing plants failed. The basic reasons given by both municipalities was that the extra loadings from the Chester County municipalities were much too large to be handled by the existing facilities and that it was not feasible to expand to that extent.

Upper Merion indicated that they could not accept sewage for treatment at the Trout Run Plant from the Valley Creek communities west of Tredyffrin Township, basing its decision on the Trout Run Plant "site size restrictions", the possibility of severe "odor problems", the "past record of cooperation with adjoining communities", the location of the existing "plant in the Norristown Dam pool" and the "economies of the situation". (See letter dated April 22, 1970 from Robert W. Geerdes, Upper Merion Township Manager, to DVRPC. Appendix 1 Exhibit 1a.)

Phoenixville felt that it would soon need all or most of its limited plant expansion to service its own internal needs, particularly the proposed newly annexed areas .

Accordingly, the Pennsylvania Environmental Hearing Board, which had directed the respective municipalities to negotiate with Phoenixville and Upper Merion, were faced with a breakdown in voluntary efforts to negotiate intergovernmental agreements between those municipalities whose sewage discharges were violating Pennsylvania's Clean Streams Act (35 P.S.§ 691.1) on the one hand, and Phoenixville and Upper Merion, governmental entities which were not in violation of the Clean Streams Act. The question of whether the Environmental Hearing Board had the power to require a non-violating entity to offer part of its capacity to a violating entity was not addressed by the Environmental Hearing Board until June 18, 1973, more than 3 years later, in the case of DER v. City of Uniontown (Docket #72-203). In that case Chairman Broughton described the question as "a fundamental issue not thus far dealt with by the Board". Although in that case of first impression the Board decided that it did have the power to force a non-violating municipality to treat the sewage of a violating municipality, it is understandable why when the negotiations with Phoenixville and Upper Merion broke down, more than 3-1/2 years before the Uniontown case was decided, DER would have been agreeable to the various municipalities coming together to propose the Valley Forge Sewage Treatment project.

Although the Trout Run and Phoenixville negotiations were probably the most extensive, there had been unsuccessful negotiations with other municipalities to explore tieing in to their plants, which are summarized as follows.

The Valley Forge Sewer Authority (VFSA) composed of East Pikeland, Charlestown and Schuylkill Townships had approached the Montgomery County Sewer Authority to provide service by way of a Schuylkill River crossing to the Oaks sewage treatment facility in Upper Providence Township. However, Montgomery County Sewer Authority stated that it would not have the capacity for VFSA, and that if expansion was desired, it would not be in the immediate future nor would it have adequate capacity to include VFSA (Appendix 1 Exhibit 2).

An in-depth study had been made jointly by the Montgomery County Sewer Authority and VFSA to determine the feasibility of (1) treating all sanitary sewage at the Montgomery County Oaks Sewage Treatment Plant, (2) treating all sanitary sewage at the Valley Forge Sewage Treatment Plant or (3) upgrading the Oaks Sewage Treatment Plant and constructing the Valley Forge Sewage Treatment Plant. The results of this study were that Montgomery County Sewer Authority and VFSA recommended that both plants be built. A copy of this report is included in Appendix 1 Exhibit 3 and an extensive discussion of this alternative is contained in Section IV, Part II, D., "Structural Alternatives".

The Tredyffrin Township Municipal Authority had negotiated with adjoining municipalities for a satisfactory sewage system to service the Paoli area. Consideration was given to an independent system within the township, which proved to be economically very costly and directly opposed to the regional guidelines proposed by the Chester County Planning Commission, DVRPC, DRBC, DER and EPA. Consideration was also given to sharing the collection system with the adjoining municipalities of Easttown Township, East Whiteland Township, Malvern Borough and Willistown Township. Tredyffrin would have then furnished the treatment facilities to be located on the Little Valley Creek. This alternative was discontinued with the opportunity to negotiate an agreement with VFSA, which was suggested to be economically favorable and conformed more to the guidelines set forth by the regulatory agencies.

The Chester County Master Sewer Plan, prepared in 1966-68 by Roy F. Weston, Environmental Engineers, and adopted in 1968 was one of the first plans prepared and approved under Act 537, the Pennsylvania Sewage Facilities Act. As a result of the unsuccessful negotiations to tie in with existing plants, in February, 1970, VFSA presented to the other participating municipalities a preliminary study outlining the subregional single treatment plant concept, and a revision of the Act 537 Plan was submitted to

Chester County. This revision was approved by the Chester County Planning Commission in May, 1970, by DER on June 29, 1970, by DRBC in August, 1971 (and added to its Comprehensive Plan (Section 9)) and by DVRPC in October, 1971. In the DVRPC evaluation, the project was found to be consistent with the Regional Water Pollution Control Plan and planning process which had been amended on July 22, 1970. Copies of all pertinent documents, including letters from the Chester County Planning Commission, staff review by DVRPC and review by DRBC in regard to the Valley Forge project is included in Appendix _1_ of this EIS.

In the interim, in November, 1970 an agreement was executed between VFSA and Tredyffrin, East Whiteland, Willistown and Easttown Township Municipal Authorities and Malvern Municipal Authority, for the design and construction of a regional sewage treatment plant now known as the Valley Forge Area Sewage Treatment Project (Appendix _1_ Exhibit _4_).

Construction grant applications by the various participating municipalities making up the Valley Forge Project were submitted to EPA after the plan had received the approval of the Chester County Planning Commission, DVRPC, DRPC, DER, and all the planning commissions of the participating municipalities, and was then ready to be advertised for bids, pending full approval from EPA.

Upon review of the applications and the Environmental Assessment, on October 26, 1972, EPA issued a "Negative Declaration" indicating that an Environmental Impact Statement was not required (Appendix _1_ Exhibit _5_). Following this decision and subsequent public notification, petitions filed by the AdHoc Sewer Committee consisting of 1,163 signatures of Willistown Township residents and by the Chester Valley Knoll Civic Association, Inc., consisting of 320 signatures of East Whiteland Township residents, and the Valley Forge Park Commission were received by EPA requesting the preparation of an Environmental Impact Statment (Appendix _1_ Exhibit _6_). Due to the controversy surrounding the proposed project, EPA issued a "Notice of Intent" on November 22, 1972 indicating that an Environmental Impact Statement would be prepared (Appendix _1_ Exhibit _7_).

On January 18, 1973*, representatives of the municipalities participating in the Valley Forge sewer project signed EPA wastewater treatment facility construction grant offers and acceptances. Each of the grants, however, contained the following conditions which preserved EPA's right to require corrective actions by the participating municipalities if the NEPA study revealed certain adverse environmental impacts resulting from the proposed project:

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* Willistown's was not signed until July, 1973, and the quoted conditions were merely summarized in its grant.

"Grantee agrees that this grant offer is expressly conditioned upon its implementation of all such project changes and upon the implementation of such environmentally protective measures, assurances and regulations which may include but are not limited to the following (whether the adoption and implementation of such measures, assurances and regulations are or are not within the control of grantee):

1. Environmentally Sensitive Areas

   a. Measures

   Identification of environmentally sensitive areas, the latter including but not limited to existing and proposed public open spaces, floodplains and their related impounding areas, ground water recharge areas, excessively sloping land, existing ground cover including wooded areas, present or future parkland and historical sites.

   b. Assurances

   Binding assurance in contract and map form that the Grantee will not provide any sewer service that will create environmentally adverse developmental pressure on these sensitive areas.

   c. Regulations

   Passage by appropriate organs of government of necessary environmentally protective regulations.

2. Development Areas

   a. Measures

   Determination of, in cooperation with the DVRPC, the projected growth and intensity of land use by sub-area based on (a) the environmentally suitable use of the land, (b) the existing and future accessibility by highway (freeway and arterial) and transit (highspeed rail and bus), (c) present and future availability and distribution of potable water supply, (d) present and future community service facilities, (e) planned availability and capacity of sanitary sewer service.

b. Assurance

The Grantee agrees to provide adequate sewer capacity to serve an area planned in accordance with the factors enumerated in Part 2, a, above in cooperation with DVRPC.

c. Regulations

Passage by appropriate organs of government of necessary environmentally protective regulations."

D. Purpose of the Proposed Project

The purpose of the project, in keeping with the objectives and goals of FWPCA, is to clean up the surface and groundwaters in the Study Area and provide the means to eliminate an existing public health hazard. Waste collection and treatment facilities have been designed to accomplish this purpose first in the Initial Service Area where existing domestic and industrial pollutants are the most severe and by 1985 in the Design Service Area, to eliminate the existing and potential water quality problems in the proposed project area. This is to be done within the constraints of economic feasibility and cost-effectiveness of the system.

Domestic wastes, currently treated by on-lot sewage disposal systems which evidence an ever-increasing rate of malfunction and failure within the Study Area, will be collected by the system and conveyed to the Plant. Thus the present dangers to public health, the costly and recurring nuisance of maintaining the on-lot septic systems and the source of major stream and groundwater pollution will be alleviated to the greatest extent possible.

Industries in the Study Area after pretreatment will discharge their wastes through the publicly owned treatment facilities. Pretreatment standards will be designed to regulate the introduction of complex industrial wastes that either pass through or damage the biological treatment system. These pretreatment standards are based on the principle that the quality and quantity of industrial waste discharge must not exceed the level that would be permitted if the industry were discharging into the receiving waters. These standards are being promulgated and enforced under the National Pollutant Discharge Elimination System (NPDES) referred to in the Introduction.

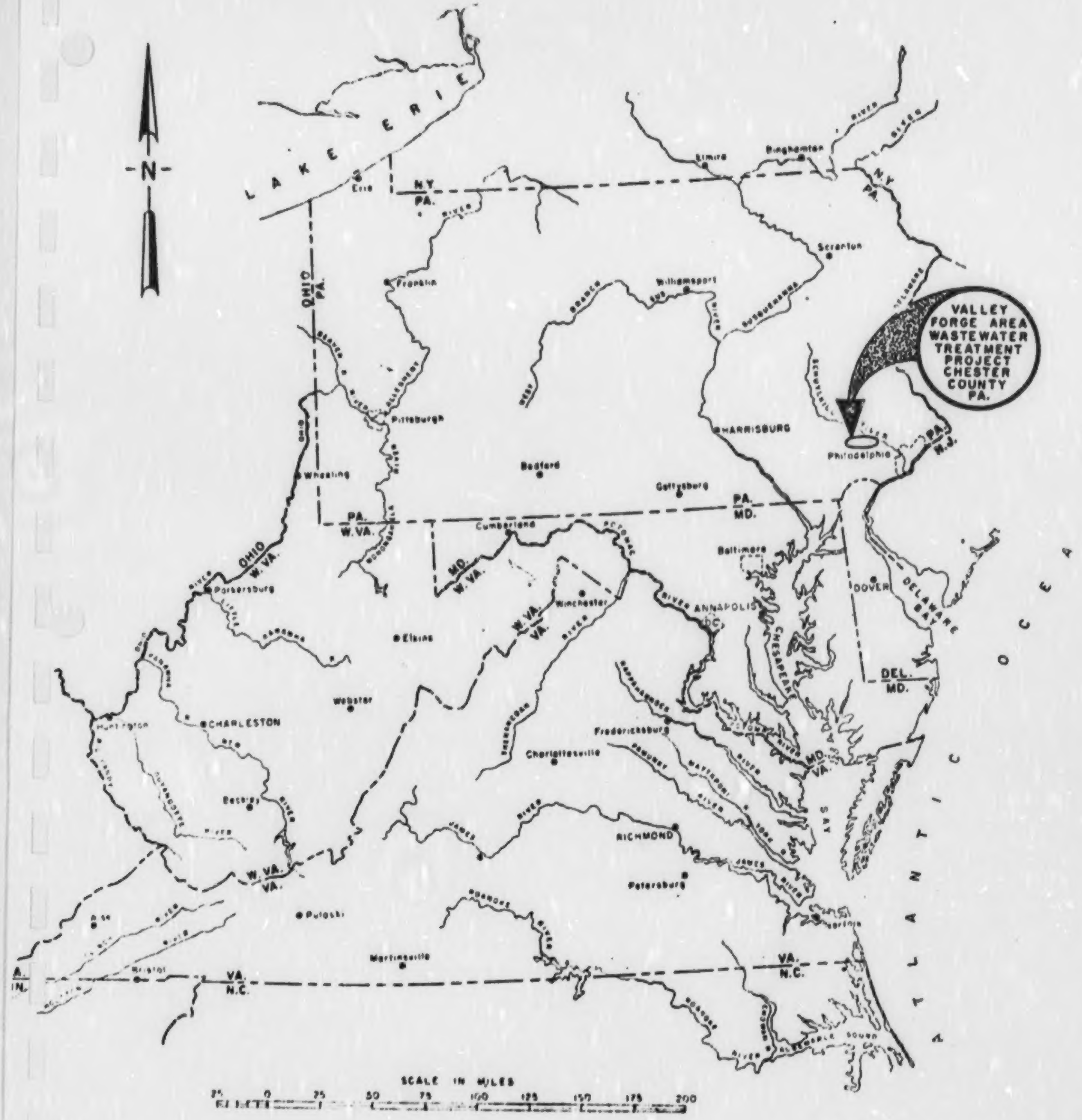
Appendix 2 Exhibit 1 includes letters and petitions from residents requesting relief and sewage facilities as well as a letter from physicians to DER requesting action "before a serious epidemic results in this area". By cleaning up the waters in the Study Area, this project will accomplish this objective.

The Chester County Health Department has compiled data indicating malfunctioning tank locations. Plate 2, "Septic Tank Malfunctions", depicts the problem areas as determined by the Health Department. Based on field investigation, this Agency feels that the number of "dots" on Plate 2 which represent a problem area, understates the total problem. Many more malfunctioning tanks were found in the field not depicted on the map; therefore, the actual number of malfunctioning septic tanks is probably far greater than what is shown on Plate 2.

Appendix 2 of this EIS includes further documentation demonstrative of the existing septic tank failures in the Study Area. In addition, Exhibit 4 is a letter from the Chester County Health Department transmitting the results of a survey used to compute relief percentages. In that letter, Mr. Dennis Atland, Supervising Sanitarian, makes these comments:

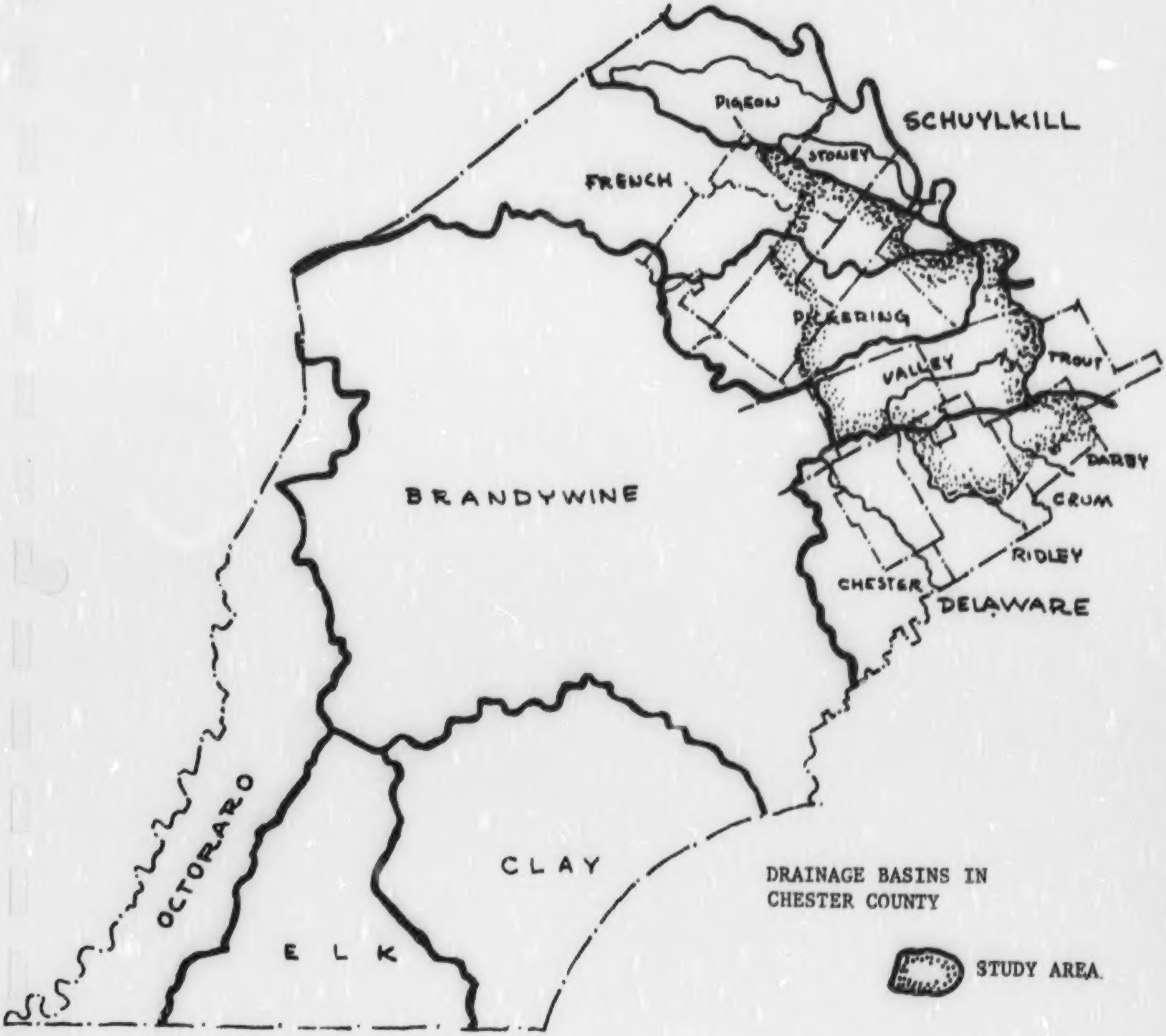
> "In communities or subdivisions where the problem of malfunctioning sewage systems is common to almost all property owners, it has been our experience that very few complaints of malfunctioning sewage systems are received by this Department. This fact also suggests that it is difficult to thoroughly define such problems."
>
> "Subsurface sewage disposal systems are only temporary. In years to come many sewage systems which now function properly will malfunction."

For further discussion of on-lot sewage system malfunctions, see Section II.C.4, "On-Lot Sewage Systems."


N
LAKE ERIE
Erie
N.Y.
PA.
OHIO
PA.
Franklin
Pittsburgh
Wheeling
Parkersburg
OHIO
W. VA.
PA.
W. VA.
Cumberland
MD.
W. VA.
Elmira
Binghamton
Scranton
Williamsport
HARRISBURG
Bedford
Gettysburg
PA.
MD.
Baltimore
ANNAPOLIS
D.C.
Philadelphia
PA.
N.J.
N.Y.
PA.
VALLEY FORGE AREA WASTEWATER TREATMENT PROJECT CHESTER COUNTY PA.
DOVER
DELAWARE BAY
DEL.
MD.
CHESAPEAKE BAY
MD.
VA.
Winchester
W. VA.
VA.
Elkins
Webster
CHARLESTON
Huntington
Beckley
W. VA.
VA.
Fredericksburg
Charlottesville
RICHMOND
Petersburg
Norfolk
Pulaski
Martinsville
Bristol
VA.
N.C.
VA.
N.C.
ATLANTIC OCEAN
SCALE IN MILES
25
0
25
50
75
100
125
150
175
200

MIDDLE ATLANTIC REGION

FIGURE I-1


SCHUYLKILL
PIGEON
STONEY
FRENCH
PICKERING
VALLEY
TROUT
DARBY
CRUM
RIDLEY
CHESTER
DELAWARE
BRANDYWINE
OCTORARO
CLAY
ELK
STUDY AREA.

DRAINAGE BASINS IN
CHESTER COUNTY

FIGURE I-2

II. ENVIRONMENTAL SETTING.

A. Introduction

Increasingly, our nation has recognized that the natural environment - air and water, streams, hills and valleys, soils and the vegetative cover on the land - impose constraints on our use of the land. When these natural constraints are violated, especially in the urbanization process, pollution and degradation of the natural environment ensue.

The Study Area is no exception. In many areas, surface and subsurface water is polluted by domestic and industrial wastes. Health hazards have mushroomed from malfunctioning on-lot sewage facilities. Discharges of waste and storm water into the limestone formation underlying Chester Valley are increasing dangers from subsidence. Erosion from construction, particularly on steep slopes, has clogged streams with sediment, killing fish and their food supply. Scattered development is increasing costs of providing needed public services and facilities, as well as energy costs.

In certain areas, the costs of corrective action in the natural and man-made environment exceed man's willingness to pay for the solution, leaving it for future generations to bear these discomforts. One of the best examples is the degradation of water quality which now requires a national effort to correct.

In the following sections, the natural environmental setting as well as its environmental constraints on future development within the Study Area are identified to provide the basis of determining the impact of the Federal action (i.e., the proposed Valley Forge Area Wastewater Treatment Facility) on the environment. This data may also be helpful to enable elected officials and citizens to minimize future costs of urbanization and protect the natural environment and the quality of life in the Study Area.

B. Natural Environmental Setting

1. Climatology

In Northeastern Chester County, the normal climate is humid and temperate with few extreme changes in temperature within short periods. The area is subjected to moderate precipitation with annual rainfall averaging from 40 to 46 inches, about half of the precipitation falling during the warm months, May through September. Much of the summer rainfall occurs as intense thunderstorms, numbering 25 to 30 per year. Extensive flooding results from these thunderstorms or early fall hurricanes. Due to a combination of heavy rain and snow melt, floods often occur also in

March and April each year. Snow accounts for a considerable portion of the precipitation with annual amounts averaging between 20 and 30 inches. The average annual temperature for the area is 53.4°F with minimum temperatures during December through February usually below freezing but seldom falling below 0°F. The average frost free period of 190 days falls between mid-April to the latter part of October. Data on precipitation, snowfall and temperatures for the years 1930 through 1960 as recorded by the Phoenixville, Pennsylvania weather bureau station are shown in Tables II-1, II-2 and II-3.

TABLE II-1

TOTAL SNOWFALL (INCHES)

Year.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1930-31	0	T	1.0	2.0	1.4	2.7
1931-32	0	4.0	T	T	2.0	3.5
1932-33	0	0	11.0	T	11.1	2.9
1933-34	0	T	7.8	T	23.0	9.5
1934-35	0	T	1.5	27.0	8.3	1.6
1935-36	0	T	11.5	8.2	13.2	2.3
1936-37	0	T	T	2.0	4.0	8.5
1937-38	T	T	T	3.8	4.2	1.5
1938-39	0	14.0	T	12.1	T	1.7
1939-40	0	1.0	3.9	2.3	17.0	2.5
1940-41	2.5	T	3.5	9.1	6.0	16.0
1941-42	0	0	0.4	5.0	-	0.4
1942-43	0	T	5.5	5.1	T	3.5
1943-44	T	T	T	-	6.0	12.8
1944-45	0	0.2	5.0	20.6	7.0	0
1945-46	0	T	12.0	3.0	8.5	0
1946-47	0	0	1.4	4.8	17.2	6.1
1947-48	0	T	4.5	18.5	10.8	4.6
1948-49	0	0	-	-	3.0	3.5
1949-50	0	T	T	-	0.8	0.5
1950-51	0	1.8	2.5	-	-	-
1951-52	0	T	-	0.5	-	11.0
1952-53	0.4	1.5	4.3	1.9	T	2.0
1953-54	0	1.0	-	10.5	T	T
1954-55	0	0	0	1.0	-	T
1955-56	0	3.0	2.0	6.0	0.1	-
1956-57	0	0	0	1.2	-	-
1957-58	0	0	13.0	2.0	14.5	21.0
1958-59	0	0	1.8	-	-	0.5
1959-60	0	0	2.0	-	-	6.3

TABLE II-2

Total Precipitation (inches)

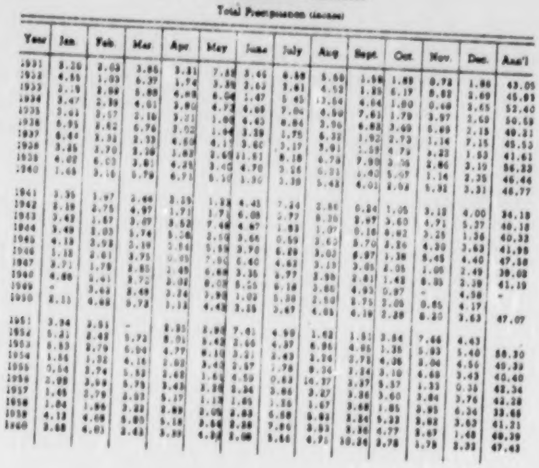
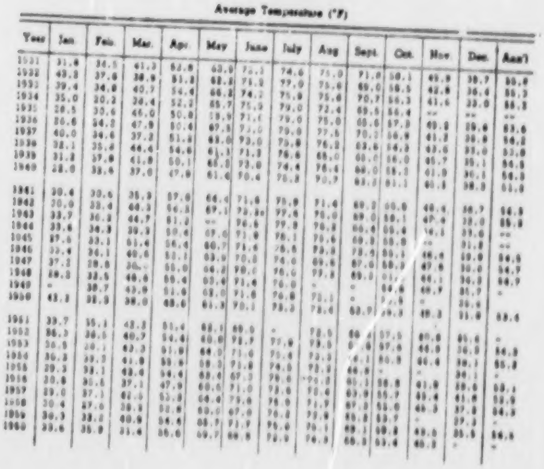


TABLE II-3

Average Temperature (°F)



2. Topography

The Study Area is wholly within the band of hard rock rolling lowlands known as the Piedmont. Most of the ridges tend to follow a northeast-southwest pattern. The general slope of the land and main streams trend to the southeast toward the Coastal Plain without regard to the strength and orientation of the rocks. The Piedmont is an area generally of fairly deep, sharp valleys as the hard, crystalline rocks have resisted extreme eroding, forming gorges in an undulating to a steeply rolling terrain. The Study Area generally falls within a 65 foot to 600 foot elevation.

Because of these terrain characteristics, hillside slopes must be considered as a natural constraint on development. In the Draft EIS, slope characteristics were based on the soil survey discussed in following sections; however, it was found that the definition of slopes based on soils tended to grossly understate the extent of this natural environmental constraint within the Study Area. Accordingly, land with a slope greater than 15 feet in 100 feet (15% slope) was plotted based on engineering calculations of the U.S. Geological Survey topography by Chester County engineers. These steeply sloping areas are shown in the new map (Plate A - Natural Features) prepared for the Final EIS.

Within the Study Area the steeply sloping land is predominately along the North and South Valley Hills. The moderately sloping land lies adjacent to these ridges and primarily in the Pickering Creek Basin. The level and gently sloping land is located mainly within the Chester Valley.

The Design Service Area includes all or part of three major physiographic regions in Chester County as delineated by the Chester County Planning Commission:

a. The Schuylkill Valley and Triassic Lowland, including portions of East Pikeland, Charlestown and Schuylkill Townships, is generally characterized by relatively level gentle lowland. The area includes portions of the French Creek Drainage Basin as well as portions of Pickering Creek and the Pickering Creek Reservoir. The natural drainage is considered good.

b. Chester Valley, which extends northeast and southwest across the middle of Chester County, is the outstanding topographic feature of the Study Area. The affected townships in the proposed project which fall within the Chester Valley are the southern portions of Charlestown, East Whiteland, Tredyffrin, and the northern-most sections of Malvern Borough and Willistown Township. The Valley ranges in width from less than 1 mile at the Lancaster County line to about 2 miles at the Schuylkill River. The floor of the Valley is nearly level to moderately sloping, and it does not serve as a main drainageway for any stream.

However, Little Valley Creek and Valley Creek represent the two streams in this area that have been classified as being a sub-minor drainage basin and a minor drainage basin, respectively.

c. The West Chester-Paoli Plain is representative of the southern section of the Study Area. Easttown Township and the remainder of Malvern Borough and Willistown Township are within this region. The gently rolling terrain supports many estate-type farms in this area. Crum and Darby Creeks accentuate this region, draining those particular areas to be serviced.

3. Geology

The Study Area is geologically comprised of complex, folded and altered rocks of many ages and of all three origins: igneous, metamorphic and sedimentary. Plate 10 depicts the eight major types of rock, and known gravel deposits and fault lines in the Study Area. A short description of each of the rock types follows, with the listing running generally from north to south:

a. Shales and Sandstones, approximately 14% of the Study Area, are sedimentary in nature, formed during the late Triassic era; are comprised of eroded sands and muds (deposited from the surrounding highlands), that were compressed and hardened into rock; are flat with a gentle northerly dip and an east-northeast strike of relative gentle folds forming a landscape of elongated ridges and valleys parallel to the folds; and, depending on the porosity, are generally good sources of groundwater.

b. Hybrid Gneiss, approximately 36% of the Study Area, are metamorphic rocks formed by the recrystallization of both sedimentary and igneous rocks; are hard and have a great resistance to erosion; have generally formed rolling uplands; and are poor sources of groundwater due to its low porosity and permeability.

c. Graphitic Gneiss, approximately 9% of the Study Area, possess similar properties to the Hybrid Gneiss with the major differences being the presence of graphite and a slightly higher supply of groundwater.

d. Pegmatite, approximately 1% of the Study Area, is a very coarse granitic rock, irregular in depth, and yields small quantities of groundwater.

e. Chickies Group (Quartzite), approximately 4% of the Study Area, is sandstone and appears as a hard, smooth rock, resists erosion and forms high sharp ridges, and is low in groundwater yields.

f. Schist, approximately 17% of the Study Area, is formed from metamorphosed soft clay shales, is moderately hard and subject to severe weathering and is moderate to good source of groundwater.

g. Limestones and Dolomites, approximately 15% of the Study Area, are sedimentary in nature, having resulted from the deposition of shells developed by microscopic animals which existed in the ancient seas of the Cambrian and Orodovician ages; are slowly dissolved when exposed to air, water and the residue of decaying vegetation, forming underground channels, caves and sink holes; and are sources of good quantities of groundwater, but the danger of pollutants are great.*

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*In the "Comprehensive Area-wide Sewerage Plan for Chester County", prepared by Roy F. Weston, Environmental Engineers, in 1966-68, it was pointed out that "the presence of these limestone deposits exerts two significant effects on sewer needs within the County. First, the limestone deposits, because of their susceptibility to development of solution channels, are a significant source of groundwater, producing the wells of greatest yield in the County. However, this susceptibility to formation of solution channels (and in the case of severely weathered rock formations, the high permeability) contributes to easy contamination of the groundwater from on-lot sewage disposal systems, both by vertical travel of sewage and by extensive horizontal transport of such contaminants through the channel-connected groundwater systems. Additionally, the susceptibility to solution channeling creates potential hazards with regard to foundation suitability for the support of large buildings and other structures, through development of sink holes, rock slides, and other localized surface and subsurface displacements. Such conditions can have substantial adverse effect on potential land use within the susceptible areas." (Emphasis added)

h. **Serpentine**, approximately 2% of the Study Area, are metamorphic rocks formed from igneous intrusions, generally form low, flat uplands, and are good sources of groundwater.

i. **Gravel Deposits** comprise approximately 2% of the Study Area.

4. Earthquakes

According to the 1969 Seismic Risk Map developed by the U.S. Coast and Geodetic Survey, Pennsylvania, New Jersey and Delaware lie in a minor earthquake damage zone of reasonable expectancy for the next century. However, the Study Area has not experienced any damaging earthquakes in recent times and is very low in seismic activity, although in 1969 and in early 1973, it did feel quakes that were centered in the Wilmington, Delaware area and registered below 6 on the Richter Scale.

5. Soils

Within the Study Area, there are six general soil groups called soil associations. Each association usually contains a few major soils and several minor soils in a pattern characteristic although not strictly uniform. Soil associations tend to conform very closely to their underlying major rock types from which they were derived. Accordingly, the associations follow the rock formations identified in the preceding section and Plate 10. In the brief descriptions which follow, the associations are listed generally from north to south and identify the underlying rock structure on which they are located.

- The Penn-Croton-Bucks association comprises approximately 15% of the area, is shallow to deep, silty, and is underlain mostly by red shale and sandstone.

- The Glenelg-Manor-Chester association, accounting for approximately 50% of the soils in the area, is underlain primarily by hybrid and graphitic gneiss. It is generally shallow to deep, silty and channery soils, ranging from level to steep, but the largest acreage is gently to moderately sloping.

- The Edgemont association comprises approximately 8% of the area, is moderately deep and is underlain by quartzite and phyllite (Chickies Group).

- The Hagerstown-Conestoga-Guthrie association comprises approximately 15% of the area, is deep, silty soils underlain by limestone, and comprises much of the Chester Valley along Valley Creek.

- The Neshaminy-Chrome-Conowings association comprises approximately 4% of the area, is moderately deep and silty, and is underlain by serpentine and hybrid gneiss.

- The Neshaminy-Glenelg association comprises approximately 8% of the area, is moderately deep to deep, well-drained, silty, channery, gravelly and is underlain by hybrid gneiss.

These descriptions were drawn from the U.S. Department of Agriculture Soil Survey for Chester and Delaware County, published in May, 1963. In the following two sections, this survey is analyzed to determine the agricultural land capabilities and the soil limitations for community development.

a. Agricultural Land Capabilities

One of the major purposes of the 1963 soil survey was to identify the value of land for farming and assist farmers in planning the kind of management which would protect their soils and provide good yields. To accomplish this purpose soils were grouped into eight classes, using a nation-wide system based on the limitations of the soils, on the risk of damage when they are used and on the way they respond to soil conservation measures.

Class I soils have few limitations, the widest range of use and the least risk of damage when used for agricultural purposes. Class II soils have some limitations that reduce the choice of plants or that require moderate conservation practices. Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both. These classes represent land suitable for regular cultivation and constitute prime agricultural areas which are a local, state and national resource that is finite and irreplaceable.

Class IV land constitutes areas suitable for occasional cultivation due to excess water and severe erosion problems. Class V through VIII land is generally not suitable for cultivation.

Plate 6 shows the agricultural land capabilities within the Study Area. While practically no Class I land remains, the area is well endowed with Class II and Class III lands which to date have not been committed to urban development. The protection of portions of this remaining prime agricultural land for production of food should be seriously considered by local government in dividing those areas which could be designated by local government for urbanization and sewering from those which could remain in crops, pasture and farm areas (see Section VI, "Conclusions and Recommendations").

b. Soil Limitations for Community Development

In 1971, the soil data collected in the soil survey for Chester County was subjected to a detailed interpretation by the U.S. Department of Agriculture, Soil Conservation Service, to provide information about the physical and chemical properties of the 58 soils identified. These interpretations were made to enable a user to select soil areas most suitable for a particular use and to predict the type and degree of problems most likely to be encountered.

Of particular importance within the Study Area was the need to identify those soils which were unsuitable for on-lot sewage disposal and therefore required sewer service and those soils which at low densities could support such facilities to treat domestic wastewater. The physical and chemical properties of the soils used in this analysis are: depth to bedrock, depth to seasonal high water table, high water table permeability, available moisture capacity and hazard of groundwater contamination. These soil variables constitute the natural constraints that will determine the degree of limitation in providing septic tank drain fields within the Study Area.

In the individual soil interpretations, the degree of soil limitation for septic tank drain fields was classed as slight, moderate and severe. The soils classified as "slight" and "moderate" were mapped and identified as "soils suitable for low density on-lot sewage disposal". Soils classified as "severe" were also mapped and identified as "soils requiring sewers". This data is shown on Plate A.

While "hazard of groundwater contamination" is one of the variables included in the above analysis to identify land requiring sewer service, it should be pointed out that the limestone areas of the Great Valley which form the major aquifer in the Study Area and the soils derived from limestone, constitute a special problem. Many of the existing residential, commercial and industrial land uses that are situated on the limestone areas are discharging their wastewaters into the limestone formation. There is little surface evidence of malfunctioning of on-lot sewage facilities because the effluent is readily accepted in the aquifer. But such discharges are not only contaminating the groundwater but reacting with the limestone and accelerating the formation of underground streams and caverns leading to the intensification of sink holes and subsidence problems in the Study Area.

The provision of sanitary sewer service to existing and future development on the limestone areas thus becomes a critical consideration in planning the collection system for wastewater within the Study Area. Prohibition of further development in these sensitive environmental areas should also be considered until sewer service can be provided to protect the existing residences and industries from further acceleration of subsidence within the Study Area. Plate 8 in addition to showing the limestone area as hazardous for septic tanks also shows the other areas which are not suitable for septic tanks. In total, these areas thus designated in Plate 8 conform to and validate the land areas identified as requiring sewer service in Plate A. Plate 7 simply shows the converse, i.e., areas suitable for buildings and septic tanks.

6. Hydrology

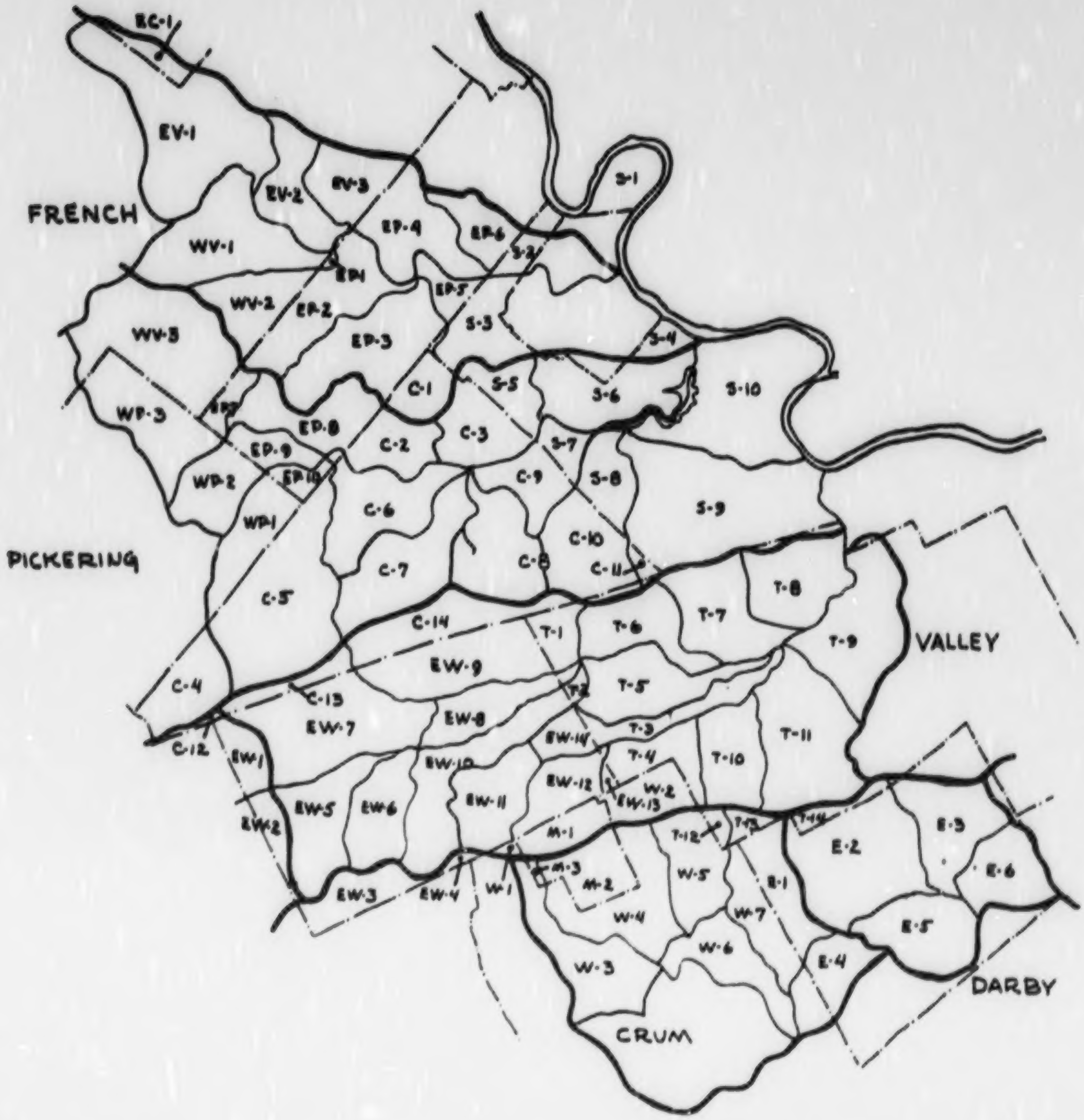
a. Surface Water

As indicated on Plate 5, the Study Area is divided into two major drainage basins defined by their ridge lines. The majority of the land area falls within the Schuylkill River Basin and the smaller southern area within the Delaware River Basin. The Schuylkill Basin in the Study Area is further divided by submajor basins: the lower basins of the French and Pickering Creeks and the entire submajor basin of Valley Creeks. The Delaware Basin in the Study Area includes only the headwaters of the Crum and Darby Creek Basins. Accordingly, the municipalities within the French and Pickering Basins in the Study Area must seek and obtain the cooperation of municipalities upstream to achieve water quality objectives, while others, within Valley Creek and Crum and Darby Basins, are solely responsible for water quality within their boundaries.

The numerous, small natural drainage basins with their attendant streams also form the boundaries of the geographic areas used in planning for water quality and wastewater management. Streams define the locations for the wastewater collector systems since transmission is dependent on gravity flow and the numerous small drainage basins in the major subbasins define the geographic area to be served. Thus, the small drainage basins become the management unit and the logical area of analysis to determine if, when and where sewer service should be provided.

In Figure II-1, the small drainage basins within the Study Area have been delineated by ridge lines and streams and can be aggregated by submajor basin or municipality. The small drainage basins are also used in Plates A, B and C and will be the basis of subsequent analysis dealing with population, environmentally sensitive areas (including soil types, flood plains and slope) and land available for future development.

In regard to the submajor streams within the Study Area, little hydrological data is available with the exception of the Valley Creek Basin. A special study was made of this area by DER's Bureau of Engineering in February, 1973 in response to the expressed concern of the Valley Forge State Park Commission that further urbanization of the Valley Creek Watershed might result in increased danger of flooding of the Washington Headquarters Building.


EC-1
EV-1
EV-2
EV-3
FRENCH
WV-1
EP-4
EP-6
S-1
S-2
EP-1
EP-5
WV-2
EP-2
WV-3
EP-3
S-3
S-4
C-1
S-5
S-6
S-10
WP-3
EP-7
EP-8
C-2
C-3
S-7
EP-9
WP-2
EP-10
C-9
S-8
S-9
WP-1
C-6
C-10
PICKERING
C-7
C-8
C-11
T-8
C-5
C-14
T-1
T-6
T-7
T-9
VALLEY
EW-9
C-4
C-13
T-2
T-5
EW-7
EW-8
C-12
EW-1
EW-14
T-3
T-4
T-10
T-11
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E-2
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M-2
W-5
E-1
E-6
EW-3
EW-4
W-1
W-4
W-7
E-5
W-6
W-3
E-4
DARBY
CRUM

SMALL DRAINAGE BASINS

WITHIN STUDY AREA

FIGURE II-1

The findings of this study for the 23.4 square mile watershed were:

1. "Because of the lack of actual flow-data for Valley Creek, design discharges were synthesized and must be considered approximate.

2. "The watershed comprises one of the areas receiving the most intense thunderstorms in the State. Its maximum rainfall expected in 24 hours, once in 2.33 years, is about 3.4 inches. Because of steep slopes (transverse) near the edges of the watershed, heavy runoff and consequent erosion are likely to result.

3. "At present, developed area constitutes about 10% of the whole basin. Impervious surface... is estimated at about 2%."

4. For the existing stage of development several methods were employed to determine peak flows.

5. Future peak flows were based on research indicating that urbanization increases the peak flows by altering two conditions of the basin, i.e., by decreasing the basin lag time and by increasing the impervious surface area. The "fully" developed stage was based on 12% impervious surface areas.

6. The computed design discharges for 100 year recurrence were: undeveloped stage, 7,100 cubic feet per second (cfs) and developed stage, 10,800 cfs. The ratio of the developed to undeveloped stages was 1.53.

7. Using water surface profiles for 100 ft. length of Valley Creek upstream from its confluence with the Schuylkill River, two conditions of the Schuylkill were assumed in deriving flood elevations of Valley Creek.

The Study concluded that if the Schuylkill River were at a flood stage of 82 feet elevation which is less than the level of 88 feet reached by Hurricane Agnes, submerging the Valley Creek outflow at the Reading Railroad culvert and maximizing backwater effects in the Valley Creek, the backwater elevation of the Creek at Washington's Headquarters would be 89.8 feet (7,100 cfs) and 96.7 feet (10,800 cfs) and would inundate the Headquarters building (first floor elevation 91.0 feet) by 5.7 feet. Thus, the condition, where the drainage area is fully developed, will produce severe flooding of the Headquarters when both the Valley Creek and the Schuylkill are at flood stages.

However, the probability of the simultaneous occurrence of two peaks (Creek and River) is far beyond the concept of a 100 year condition. It must be emphasized that any flooding that would endanger the Headquarters would primarily be the effect of the floodwaters of the Schuylkill River backing up the Valley Creek causing the Creek's waters to rise. The Valley Creek at peak flood stage, according to comparative elevations, would not inundate the building by its own flooding actions.

As mentioned in the prior paragraph, if fully developed conditions are realized in the Valley Creek Drainage Basin (producing a 10,800 cfs flow in the Creek) and a storm were to cause the Schuylkill River to reach flood stage, even a no flood stage condition of the Valley Creek would cause the Washington Headquarters to be inundated as a result of the backwater effect.

Measures to hold stormwater on the land and permit gradual release to Valley Creek to avoid this possible tragic consequence are discussed in the following sections. Such measures should also be applied to the other streams in the Study Area. See Section VI, "Conclusions and Recommendations".

Because of the abundant rainfall and the limited capacity of most of the underlying rock to absorb and store water, other submajor streams including French, Pickering, Crum and Darby, in the Study Area, are subject to equivalent or more severe flood conditions as a result of urbanization.

Areas subject to inundation and flooding may be defined in several ways. One way is to plot actual flood heights from field observations and calculations. Table II-4 shows flood discharges and elevations for each drainage basin in the Schuylkill River Drainage Basin in the Study Area. Also included are flood discharges and elevations at the proposed sewage treatment plant site on the Schuylkill River. This table indicates data calculated by VFSA's consulting engineers for specific points on the creeks.

Stream and flood plains may also be defined according to alluvial soils that have been deposited in the past and are likely areas of future periodic flooding. Plate 9 and Plates A, B and C show the flood plains delineated by this method. Generally, however, this method plots flood plains representing a 50 year flood frequency, i.e., one storm of this magnitude in 50 years. The Chester County planners also report that using this technique tends to understate the floodable area in the lower reaches of the stream and overstate in the upper reaches.

The Federal Flood Disaster Protection Act of 1973, which became effective on December 31, 1973, substantially expanded the National Flood Insurance Program, provided better protection to the public by extending the emergency program through December 31, 1975,

TABLE II-4

FLOOD DISCHARGES AND ELEVATIONS

French Creek near French Creek Pumping Station
Annual Mean - 4,600 cfs

5 Yr. - 6,716 cfs - 109.2 Ft.
10 Yr. - 8,648 cfs - 110.1 Ft.
25 Yr. -11,408 cfs - 111.3 Ft.
50 Yr. -13,800 cfs - 112.0 Ft.
100 Yr. -16,100 cfs - 112.7 Ft.

Pickering Creek near White Horse Pumping Station
Annual Mean - 2,700 cfs

5 Yr. - 3,942 cfs - 110.8 Ft.
10 Yr. - 5,076 cfs - 111.3 Ft.
25 Yr. - 6,696 cfs - 111.8 Ft.
50 Yr. - 8,100 cfs - 112.2 Ft.
100 Yr. - 9,450 cfs - 112.6 Ft.

***Valley Creek near Schuylkill River**

5 Yr. - 4,200 cfs - 75.8 Ft.
10 Yr. - 7,150 cfs - 76.3 Ft.
25 Yr. - 8,660 cfs - 76.9 Ft.
50 Yr. - 9,560 cfs - 77.3 Ft.
100 Yr. -10,800 cfs - 77.6 Ft.**

Schuylkill River at Sewage Treatment Plant
Annual Mean - 41,000 cfs

5 Yr. - 54,530 cfs - 84.0 Ft.
10 Yr. - 66,010 cfs - 86.5 Ft.
25 Yr. - 82,000 cfs - 88.2 Ft.
50 Yr. - 94,300 cfs - 89.2 Ft.
100 Yr. -106,600 cfs - 90.2 Ft.

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* These flood elevations for Valley Creek have been computed based on updated information from DER's study. (reflecting Valley Creek flooding conditions only).

**See Section V.C.2, "Impacts on Water Supply" and Table V-4.

and addressed three key areas: insurance, flood plain management and local community consultation and appeals procedures. The Act retained use of the 100-year flood standard and flood hazard identification and actuarial rate studies for flood-prone communities. Under the program the engineering designation of the 100 year flood plain is provided for, and a flood plain management program to eliminate further construction in the flood hazard area is required.

Within the Study Area as of August, 1974, Malvern Borough and East Vincent, West Pikeland, East Whiteland and Tredyffrin Townships were participants in the Federal Flood Insurance Program, and East Pikeland, Easttown and Willistown were applying for participation in the program. As a condition to EPA's grants, all the participating municipalities have agreed to apply for participation by December 1, 1974, in order to protect flood plains within the Study Area. See Section VI, "Conclusions and Recommendations" and Appendix A.

b. Groundwater

Groundwater is water contained in porous spaces or fissures in the geologic materials that underlie the surface of the earth. Large supplies of groundwater form aquifers. The quantity and quality of groundwater available depend mainly on the porosity and permeability of underlying rock formations. Generally, additions to the groundwater are contributed by direct infiltration of precipitation, by subsurface flow from adjacent bodies of groundwater and, to a small degree, by artificial recharge provided by imported water such as that supplied by suburban water companies.

All groundwater in Chester County, with minor variations in the limestone areas, comes from rain or snow falling directly above and not from distant sources via underground channels. However, despite the relative abundance and even distribution of rainfall, Chester County has limited groundwater resources due to the low porosity and permeability of most of the underlying rocks, a condition which leaves relatively little space for groundwater storage. The limestone areas depicted on Plate 10, "Geology", are the only significant sources of groundwater.

The quantity and quality of the groundwater available at specific locations depend on which of the following three basic rock provinces is involved:

(1) Crystalline Rock - Crystalline rocks underlie most of the County. In these rocks, groundwater is found only in fractures and fissures. Most of this water is found above 100 feet; the yield is generally poor except in wells near streams; and the water is very soft. Because of the lack of permeability, groundwater pollution is fairly localized.

(2) *Triassic Sediments* - The County's best groundwater yields are in the Stockton formation in the Phoenixville area. Here, yields will average over 100 to 150 gallons per minute. There is some danger of groundwater pollution, particularly in the more permeable sandstones. The chemical quality of the water is moderately hard but is usually adequate for domestic purposes without treatment.

(3) *Limestones* - The limestones underlying the Chester Valley have variable water yields. Groundwater is primarily found in solution channels which can produce very large supplies. The limestone magnesium carbonates and consequently is often very hard. In addition the groundwater contamination hazard is very high in areas over limestone formations because polluted waters can enter the underlying channels easily, and can be carried long distances in unpredictable patterns because underlying water is not easily self-purifying, due to a lack of air, sunshine and filtering material.

As indicated on Plate *12*, "Aquifer Recharge Area", the limestone formation that underlies the Chester Valley deserves special consideration as the major groundwater source in the Study Area. As has been mentioned, the aquifer can be polluted by sewage effluent (domestic, institutional, industrial), polluted stream water, discharges from quarry pumping, fertilizers from agricultural run-off and toxic materials. At the same time, a large number of homes depend on wells for domestic supplies from the limestone formation and the Philadelphia Suburban Water Company makes limited use of this resource. The uses of the limestone aquifer for water supply in the future will be jeopardized unless corrective action is taken to stop further pollution. In the 1968 "Comprehensive Area-Wide Sewerage Plan for Chester County", the consultant engineering firm stated that "sewage flows from on-site disposal system have traveled through the limestone voids and polluted ground water supplies in the area. Several wells require heavy chlorination now. The construction of public sewage collection, treatment and disposal facilities would alleviate these present ground water pollution problems. However, as the County grows, this problem may intensify unless regional sewage disposal or water supply systems are built. *If adequate controls are not implemented soon, what is possibly Chester County's greatest resource -- its relatively untapped, extensive groundwater supply -- could be seriously damaged*. Although somewhat hard, the groundwater, with only minimal disinfection treatment, is capable of supplying enormous quantities of water for residential, commercial, and/or industrial uses." (emphasis added)

The report also deals with the problems of groundwater and on-lot sewage disposal systems: "The presence of near-surface groundwater can seriously inhibit proper functioning of on-lot sewage disposal systems. Overflow of such systems during wet seasons can pose a real public health hazard in addition to the more readily detectable problems of odors and unsightliness". The depth of the seasonally high water table for each soil series was included in the soils analysis as one of the variables to identify the land areas in the Study Area requiring sewer service. Since in much of the area the water table rises relatively close to the surface, it has been a major cause for a large number of malfunctioning septic systems and subsequent contamination of ground and surface waters.

c. Potable Water Supply

In the Middle Atlantic Region, along the eastern seaboard, both surface and subsurface water has been in fairly generous supply. Cost has usually not been a deterrent, particularly in comparison with sanitary sewage service. Water treatment is relatively inexpensive, especially for well water, and because water systems are pressure systems, cost savings result from reduced diameter lines and fewer pumping stations. In recent years, however, water supply has become a problem in some areas. Through a set of circumstances, for the most part not of local origin, Chester County and the Study Area may be one such problem section, particularly in light of anticipated growth and urbanization in eastern Chester County. The following factors each contribute to this situation in varying degrees:

(1) Limited Ground Yield: Groundwater supply in the Study Area is limited as described previously. Average yields are 0 to 10 gpm in the Pickering and French Creek Drainage Basins, with the exception of a 60 gpm belt extending from Valley Forge through Schuylkill, Phoenixville and East Pikeland. In Valley Creek, the water supply is classified as variable and dangerous. In the headwaters of Darby and Crum Creeks, yields are low to moderate (0 to 60 gpm). While these yields have in the past been satisfactory for individual residential wells and municipal service to scattered settlements, it is by no means sufficient for areas of near total urbanization or heavy industrial use.

(2) Prior Heavy Use in Delaware Valley: The Delaware River Drainage Basin, of which the Schuylkill River is a part, is one of the most heavily used sources of water in the United States. Not only is the drainage basin used by the Philadelphia metropolitan area and five smaller metropolitan areas*, it is also drawn upon heavily by New York City which impounds water in the river's headwaters and then pumps it into the Hudson Valley for the city's use.

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*The Scranton, Reading, Allentown-Bethlehem-Easton, Trenton and Wilmington metropolitan areas also lie in the Delaware River Drainage Basin.

(3) Surface Water Pollution: Pollution on the major rivers as well as some tributaries makes the use of surface water less desirable due to increased treatment costs and reduced water flow.

All of these factors either directly or indirectly affect Chester County's water supply. The following is a summary of the county situation quoted from a 1969 report of the Chester County Planning Commission entitled "Water Supply Sketch Plan":

> "Ground Water Resources May Need Supplementation in Urban Areas
>
> "Earlier studies suggested that ground water would have limited usefulness in meeting Chester County's future urban water needs. This is because hard crystaline type rocks underlay most of Chester County that have little void space for ground water storage. Most randomly drilled wells produce low yields.
>
> "However, recent work of ground water geologists have raised the possibilities that knowledgeable drillings into fracture areas, usually in topographic depressions, would provide larger yields often sufficient to support small community well systems. Groundwater geology is a complex area, needing further detailed study. The possibilities of long utilization of groundwater depended largely in keeping much open land so that rainfall from Chester County's long range average of 44" per year can permeate into the ground.
>
> "However, it appears likely that groundwater will need supplementation from surface waters in the more urbanized parts of the county and that water supply planning needs to consider both ground and surface waters.
>
> "Small, Surface Reservoirs Would Alone Not Provide for an Adequate Economical and Flexible Solution
>
> "The number of well located surface water reservoir sites is limited, because they would be too far from the supply needs; or would be too small; would result in unsightly drawdowns; would take expensive farm land and require road relocations; would be subject to siltation and evaporation; would not lend themselves

to an integrated system of water transfer. Therefore, it appears undesirable and uneconomical to approach Chester County's water needs with only a series of small reservoirs. However, small reservoirs could be used as storage and regulating reservoirs in conjunction with the proposed Mason-Dixon Aqueduct.

"The Mason-Dixon Aqueduct Could Connect the Schuylkill and the Susquehanna

"The most imaginative comprehensive flexible answer to the water needs of Chester and neighboring counties may be a large two-way aqueduct from the relatively lightly tapped Susquehanna to the Schuylkill and Delaware Rivers. An aqueduct along strategic ridges could augment many of the streams of southeastern Pennsylvania at times of low flow.

"The Mason-Dixon and associated aqueducts could directly, or indirectly serve most of Chester County. It would create a flexible integrated system of water supply whereby the smaller reservoirs and pipeline systems would be linked together so that water could be transferred to areas of need."

7. Biology

The following biological survey constitutes a partial inventory of the Peripheral Study Area, and was gathered from published reports of biological studies conducted in the area. These publications are listed in Appendix 3 along with the other references. The species listed were found or are known to be present in the Peripheral Study Area and are very representative of southeastern Pennsylvania, which contains areas ranging from high density human development where habitat for wildlife is very limited, to rural farming communities and open space where sufficient habitat is available to support a rather wide range and varying populations of wildlife species. No rare or endangered species are known to be present in the Peripheral Study Area. Appendix 3 contains a very extensive listing of the following:

a. Aquatic Biota

The hydraulic characteristics of the Schuylkill River which consists of a sequence of pools and riffles, are the same between Reading and Norristown; therefore, little change in aquatic biota is anticipated downstream from Vincent Dam.

(1) Vegetation. Seven species of aquatic vegetation existing in the reaches of the Schuylkill River and its tributaries within the Peripheral Study Area have been identified by Ichthyological Associates. These species are listed in their probable order of abundance:

Milfoil	Myriophyllum exalbescens
Water stargrass	Heteranthera dubia
Water celery	Potomageton crispus
Elodea	Anacharis canadensis
Arrow head	Sagittaria rigida
Duck week	Lemna minor
Water lily	Nuphar variegatum

Two other plants, one a Potomageton species and the other an emergent similar to watercress, are common but not identifiable at present. In addition, during July, filamentous algae included Cladophora and spirogyra species and other unidentified species are very abundant on the bottom and cling to aquatic plants.

Rooted aquatic plants are abundant wherever they can find mud or sandy bottoms. In the lower reaches of major tributaries and in the Schuylkill River, siltation and plant nutrients are two sets of factors involved in the abundance of aquatic plants. The detritus from these species serves as food for some organisms, but few fishes and relatively few invertebrates actually feed directly on this growing vegetation, since they appear to be more important for cover than as a food source.

(2) Invertebrates. The food habits and nutrient requirements of aquatic invertebrates have not been determined. The literature contains little information on the food habits of insects. The available data suggests that many species depend largely on organic detritus for energy and nutrients. In the Schuylkill River, annual leaffall and plant products within the river contribute most of the detritus. Plants produced within the river may also enter the food web of invertebrates through herbivorous species.

A list of macro-invetebrate families found since 1970 in the Schuylkill River and Perkiomen Creek was compiled by Ichthyological Associates. The families and genera of macro-invertebrates and invertebrates found in the Schuylkill River and the Perkiomen, and primary tributary creeks are presented in Appendix 3.

(3) Fishes. Appendix 3 also gives the common and scientific names of fishes frequently found in the Schuylkill River and its tributaries between Pottstown and Vincent Dam. All the fishes on the list reproduce locally except for the American eel which migrates downstream and spawns in the Sargasso Sea. All of the fishes are spring or summer spawners, except for the brook trout which spawns in the fall. The latter is found only occasionally in the river but is stocked by the Pennsylvania Fish Commission and spawning occurs once in a while in some tributaries.

Surveys conducted in the Perkiomen Creek and Valley Creek Drainage Basin streams showed little variation from the composition and distribution of species found in the Schuylkill River.

In general, the food supply is good in the Schuylkill River and its tributaries. A considerable amount of organic waste enters the Schuylkill through its tributaries and is a source of nutrients for fishes and other organisms. There is an abundance of macro-invertebrates (Appendix 3) and small fishes which serve as food for the larger species. Among the aquatic insects (Appendix 3), midges (chronomids) are most abundant. Bottom scum or diatomaceous ooze provide an important source of food for many of the smaller bottom feeding minnows and surface drift, mostly during the late summer.

b. Terrestrial Biota:

(1) Mammals. Appendix 3 lists mammals found or known to be present in the general project area.

(2) Birds. Resident and migratory species are listed in Appendix 3.

(3) Reptiles and Amphibians. Appendix 3 presents a partial listing of reptiles and amphibians which would most likely be observed in the Study Area.

(4) Forests. Generally only the least productive soils and steeper slopes are still wooded. Approximately 19% of the Peripheral Study Area is forested. The predominant forests are of a deciduous hardwood type and consist mainly of second and third growth timber consisting of the following major woodland association:

Red Oak - Black Oak - These species are found on the uplands and are scattered throughout the area. Red oak and black oak predominate in this group and the associate growing among these forest stands are pin oak, scarlet oak, chestnut oak, white oak, tulip poplar and beech.

Tulip Poplar - These species are found in the moist sites. Tulip poplar predominates in this group. Other species found in these forest stands are black locust, red maple, black birch, red oak, beech and gum.

Beech - Beech predominates with varying mixtures of the following: black oak, red oak, red maple, hemlock, white ash, black cherry, basswood, black birch and elm.

Chestnut Oak - Predominant species are found in the uplands and northern areas. Common associates are scarlet, white, red and black oaks, black birch and red maple.

Virginia Pine and Pitch Pine - These species are found mostly on the barrens in the southwestern part of Chester County. Principal associates are chestnut oak, black oak, white oak and bear oak.

Other trees common but less abundant are hickory, ash, elm, red maple, black walnut, black gum and black birch. Smaller trees that grow under the cover of the large trees are dogwood, sassafras and blue beech.

8. Aesthetics

The aesthetic quality or condition of the environment is to a degree, a matter of personal opinion. What may be pleasing or significant to one person may not stimulate a particularly favorable response from another person. In more general terms, it would be safe to say that society has become increasingly conscious of the value of the natural environment and of the degree to which man's activities have in many cases destroyed the unique and beautiful things in nature.

The Peripheral Study Area for the Valley Forge Sewer Project offers a number of descriptive qualities to the resident and the traveler.

The gently undulating to steeply rolling countryside of the area lends itself to a compatible condition of rural and suburban living. The landform configurations of hills and valleys and plains offer an extremely pleasing effect to the eye of anyone who has been fortunate to live or travel within the northeastern section of Chester County and the southwestern portion of Montgomery County.

The area to the north of the meandering Schuylkill River (Montgomery County) is not developed to any degree comparable to the land areas south of the River. This is essentially due to the location of transportation facilities spreading outward from the Philadelphia metropolitan area.

Major residential, commercial and light industrial development exists along the two primary transportation corridors (Route 23 - Reading Railroad and Route 202-30). Between these corridors exists a very rural setting, comprising most of the land areas of Tredyffrin, East Whiteland, Charlestown and Schuylkill Townships. Commercial and estate-type farms sandwiched between patches of woodland are responsible for the rural flavor.

Water courses in the Peripheral Study Area accentuate the rural setting, adding an aesthetically pleasing quality to the eye. The Perkiomen River and Skippack Creek form the two major drainage basins north of the Schuylkill River at the Plant site.

The Skippack joins the Perkiomen, creating a combined flow which enters the Schuylkill River at a point approximately opposite the Plant site. In the more immediate vicinity of the project design area, a number of streams above the Route 30 corridor flow west to east to the Schuylkill while several below the Route 30 corridor find their way south to the Delaware River. Generally, the conditions of these streams, and the Pickering Reservoir in Schuylkill Township, range between states of good to heavily polluted depending on where samples are taken. However, and as far as is known, none of the streams exhibit significant unsightliness or emit offensive odors. The polluted conditions are attributable primarily to human waste, industrial discharge and agricultural run-off.

Air quality for the most part provides an aesthetic appealing condition due primarily to the relative absence of pollutants, the area's moderate temperatures and the pleasant natural fragrances which are produced by the various vegetative cover. Naturally, this condition is more evident within the Pickering and Valley Creek Drainage Basins due to less population densities.

Noise levels are typical of any suburban-rural area outside a large city. Living along or within transportation corridors, however, can prove to be annoying at times with the number of vehicles increasing annually as well as continual rail transportation movements.

The historical flavor of the area is accented by the Valley Forge State Park. Owned by the Commonwealth of Pennsylvania, its 2,255 acres contain over 45 landmarks and historic sites. The Park is ideally situated on gently rolling limestone hills and offers to the thousands of people who visit the Park each year a chance to attain peaceful surroundings as well as a piece of American heritage.

The total aesthetic picture for the Peripheral Study Area, when considering the composite effect upon the senses, can be defined as being generally pleasing to visually stimulating.

C. Man-Made Environment

The consequences of man's use of his natural environment have occurred incrementally over a long period of time. As a result, the average resident in the Study Area may be unaware of both the extent to which the natural environment has been degraded and the rate of such degradation.

1. Archaeologic and Historic

In early times, the Chester Valley and the farm land north and south of the Valley offered in its natural configurations of hills, valleys and plains, a strategic military position during the winter of 1777-1778 for Washington to winter his troops at Valley Forge. Today, Valley Forge State Park, consisting of 2,255 acres and containing 45 landmarks and historic sites, has been designated a National Historic Landmark by the Secretary of the Interior. As such, it is afforded protection under the National Historic Preservation Act of 1966 and Executive Order 11593, May 13, 1971. The Park being ideally situated on the terrain described above offers to the thousands of people who visit the Park each year a chance to enjoy peaceful surroundings as well as a piece of American heritage.

The historical flavor of the Study Area was set by Valley Forge's importance during the American Revolution. Plate 14 displays historical and archaeological sites in the Study Area as currently designated by local, county, state and Federal groups or agencies. No estimation of the area occupied by historically important sites has been made. Appendix 4 lists each historical or archaeological site by municipality, and its approximate date of origin.

Of singular importance are the sites and buildings associated with the encampment of the Continental Army at Valley Forge, but in the surrounding area other sites abound. Within the limits of its own legislative power, Tredyffrin Township has taken action to protect many of the important sites surrounding Valley Forge State Park as shown on Plate 14. This was done through the enactment of an historic district ordinance which, instead of creating districts as is most often done, selected specified sites.

While many other historic places in the Study Area have been designated as shown in Appendix 4. a few have little, if any, state or national significance but are nevertheless appropriate for historic designation as locally significant sites. Outside of Tredyffrin Township, only a handful of sites are protected through ownership or listing in the state or national register and none are protected by local ordinances.

2. Existing Land Use

In the Study Area major residential, commercial, institutional and industrial development exists along the two primary transportation corridors: The Schuylkill River Corridor, consisting of the Reading Railroad and Route 23 (soon to be reinforced by the Schuylkill Expressway to Pottstown with its attendant Phoenixville Spur) and the Main Line Corridor, consisting of the Penn Central Railroad, Route 30 and Route 202 Expressway in the Chester Valley. Between these corridors exists a very rural setting, comprising most of the land areas of Tredyffrin Township north of Route 202 Expressway, and including most of East Whiteland, Charlestown and Schuylkill Townships, and practically all of East and West Pikeland, and East and West Vincent Townships. To the south of the Main Line Corridor, similar rural land use is in evidence.

Estate-type farms with painted white board fences, undisturbed woodland, and an enthusiasm for horses and foxhunting characterize the rural wedges south of the Main Line and in Charlestown and Schuylkill Townships. On the other hand, the townships located further west in the French and Pickering Creek Drainage Basins can be characterized as commercial farm areas with agricultural and dairy products. The agricultural areas, both gentlemen farms and commercial farms, until recently have enjoyed a very low level of accessibility and as a result have not been under heavy development pressure. Increasing highway and the possibility of transit accessibility combined with potential sewer service could transform these areas from basically agricultural to urban use.

An understanding of the forces that have and will shape an urban development pattern in the Study Area is necessary for the reader to independently judge why a particular area has developed the way it has, why some land use controls are becoming increasingly necessary, and why comprehensive plans are needed to provide the basis for future distribution of population and economic activities.

The three major influence groups, Natural Features, Land Availability, and Transportation Facilities and Sewer Service, are discussed in the following text and shown diagramatically in Plate 17.

a. Natural Features

The natural features of the Study Area have been extensively discussed in Subsection B above. They serve as the natural limitations upon development in evaluating alternative future land use patterns in the Study Area.

b. Land Availability

The second major influence is land availability, or more precisely, land pre-empted or temporarily withheld from development by circumstances or commitments. Examples of pre-emption would include the outright acquisition of land for park or other public purposes, or the constraint of the use of land for development which is subject to inundation or flooding in flood plain management. The orderly extension of sewer service lines can be related to permissible development densities and the timing of construction. Likewise, zoning can control the use and the density of the land. These are the arsenal of tools to be used in shaping the development pattern, while others are used to protect environmentally sensitive areas. The application of these public measures are discussed in the following portions of the EIS which deal with implementation of alternative land use plans by the municipalities in the Study Area.

c. Existing and Future Accessibility by Highway and Transit

Transportation facilities, both highway and transit within a metropolitan area, create accessibility to jobs, shops, recreation and other opportunities. As noted earlier, two major transportation corridors pass through the Study Area - the Schuylkill River Corridor and the Main Line-Chester Valley Corridor. Both have origins with colonial America and take advantage of the gentle topographic changes common to river and major ridge lines and stream valleys. Proposals for new and improved transportation facilities to reinforce these corridors and improve accesibility in the area are presented here.

Highways

The Schuylkill Valley Corridor connects Philadelphia to Pottstown, Reading and other cities, in the Pennsylvania coal regions. Plate 17, "Factors Influencing Growth," shows duplicate facilities on either side of the Schuylkill River. To the west of the Schuylkill River are Pennsylvania Routes 23 and 724, forming a major highway link between Valley Forge and Pottstown, and the Reading Railroad providing future commuter rail service. To the east are U.S. 422 and the Schuylkill Branch of the Reading Railroad. Proposed improvements shown on Plate 17, which will tend to reinforce the importance of the Schuylkill Valley Corridor, include existing alignment improvements to Routes 23 and 724 and an extension of the Schuylkill Expressway to Pottstown on the east side of the river via the Betzwood Bridge from the Route 202 Expressway in King of Prussia. An expressway connector, the Phoenixville Spur, is proposed north of Phoenixville to tie the Schuylkill Expressway to Route 23 and Route 724 west of Phoenixville. Also, improved passenger service is proposed by the Southeastern Pennsylvania Transportation Authority (SEPTA) on the main line of the Reading Railroad, including reopening a station at Valley Forge.

The Chester Valley Corridor connects Philadelphia to Harrisburg and points west. Here U.S. 30 forms the spine about which current development has taken place. U.S. 30 is supported by commuter rail service provided on the Main Line of the Penn Central railroad and by freight service on the Penn Central main line and Trenton cutoff, and on the Reading's Chester Valley Line.

The Pennsylvania Turnpike passes through the north side of the Chester Valley, with interchanges at the Schuylkill Expressway in Valley Forge and at Pennsylvania Route 100 near Downingtown. Because neither of these interchanges is in the Study Area, their impact on development has been indirect and less obvious.

The U.S. 202 Expressway passes through the Chester Valley midway between the North and South Valley Hills. Its alignment through the Study Area is essentially parallel to U.S. 30 and, for this reason, also functions as an improved U.S. 30. The frequent spacing of interchanges, its connections to other metropolitan Philadelphia areas and the nearby rail service make land in the Chester Valley desirable for almost all land uses.

Transportation improvements in the Chester Valley, as shown on Plate 17, will further reinforce this pattern. These improvements include:

1. Widening the existing U.S. 30 to four lanes through its entire length.

2. Extending the U.S. 30 Expressway from Downingtown to the U.S. 202 expressway.

3. Extending the Main Line commuter service with improvements of service to Exton, with possible long-term extensions to Downingtown and Coatesville.

4. Experimental use of the Trenton cutoff, now exclusively a freight line, as a circumferential commuter line connecting the industrial complexes lying along the Pennsylvania Turnpike between Exton and Trenton.

One proposed highway improvement shown on Plate 17 and not yet discussed is an expressway connection between the Phoenixville Spur at Pennsylvania Route 724 and the U.S. 202 Expressway at the Pennsylvania Route 401 interchange. Often called the Piedmont Expressway, this highway has enormous impact potential inasmuch as it directly connects the Schuylkill and Chester Valley Corridors through essentially rural and undeveloped Charlestown Township. Chester County believes that there is a strong need for this highway to solve long-range transportation problems.

The following excerpt from the 1967-1968 Chester County Annual Report summarizes this problem:

> "The major unresolved long range problem in Chester County expressway planning centers about the so-called '202' problem.
>
> "Chester County and its neighbors have long considered the Route 202 Expressway one of the most important highways in the northeastern United States 'Megalopolis'. It serves as an outer beltway (or circumferential) of the Philadelphia and New York metropolitan area on the west in a somewhat similar way to the New Jersey Turnpike on the east. In addition to carrying large amounts of local traffic, the 202 expressway would be the principal route to the Hudson Valley and large parts of New England from the Piedmont part of Megalopolis. Compared with most metropolitan regions, the Philadelphia region is greatly deficient in circumferentials (or beltways) which nearly always handle very heavy traffic loads and relieve undue congestion in the central area and make the radial expressways more effective and less congested.
>
> "There are two separate aspects to the problem as it affects Chester County...
>
> "Overload in the King of Prussia Area - The more complex long range problem is the anticipated overloading of expressways in the King of Prussia area, and particularly on the Betzwood Bridge. As things now stand there are 12 lanes of expressway converging on the four lane Betzwood Bridge from the north and 16 from the south.
>
> "The Montgomery and Chester County Planning Commission have long believed that the Valley Forge and King of Prussia area must be relieved of some avoidable through traffic. The most likely solution so far identified is to route regional traffic on 202 to the Phoenixville Spur by a new expressway link from Planebrook to Phoenixville generally parallel to the present Route 29 corridor. There could be a new interchange at Devault with the Pennsylvania Turnpike. (Previously observed in this report was that in the Chester Valley, the existing 202 Expressway functions more as a relocation of Route 30 than Route 202).

> "The long standing 202 problem was specifically raised during 1968 at the January Highway Commission Hearing, and particularly during the June 25, 1968 Public Hearings on the proposed 202 in Bucks and Montgomery Counties.
>
> "The Pennsylvania Department of Highways had proposed to build Route 202 through Montgomery and Bucks County from the Betzwood Bridge to New Hope Bridge.
>
> "Both the Chester and the Montgomery County Planning Commissions, among a number of other organizations, criticized the proposed terminus at Betzwood Bridge and requested a restudy of the many complex problems involved."

Construction of the Piedmont Expressway should be carefully evaluated since its presence would have an enormous impact on the undeveloped areas it is routed through.

Figure II-2, "Proposed Expressways and Major Arterials: 1966-1975", and Figure II-3, "Proposed Expressways and Major Arterials: 1976-1985", provide a general order of priorities and a time frame for the various highway projects discussed earlier in this section. Recent cutbacks in highway expenditures will likely delay completion of some projects and thus lengthen the total elapsed time for completion of all projects. Table II-5 provides a current priority list for Chester County highway improvements, thus providing some short-term perspective. The table clearly indicates an emphasis on projects located in or peripheral to the Study Area.

TABLE II-5

SUGGESTED PRIORITIES OF LARGER PROJECTS - EXISTING 6-YEAR TRANSPORTATION PROGRAM: NOVEMBER, 1971

Priority Route	Project Description
1. L. R. 1116	Phoenixville Spur - 4-lane divided: Relocation.
2. 15121	North Caln Road: Reconstruct to 24 feet.
3. T. R. 202	South of West Chester: Standby lanes.
4. T. R. 100	Lionville to Turnpike: Widen to 4 lanes.
5. T.R. 724	Kenilworth to T.R. 23: Reconstruct to 52 feet.
6. L. R. 1004	Exton By-Pass - 4-lane divided: Relocation.
7. T. R. 29	Devault to Phoenixville: Reconstruct to 24 feet.
8. T. R. 10	Parkesburg - Bridge over Railroad: Reconstruct bridge.
9. L. R. 143	Bear Hill Northeast of Paoli: Reconstruct bridge.
10. T. R. 113	Nutt Road to Phoenixville Spur: Relocation.
11. 15108	Paoli Street Bridge: Reconstruct bridge.
12. T. R. 1	Expressway to Delaware County: Construct jug handles.

Source: Status of Planning, Chester County Planning Commission.

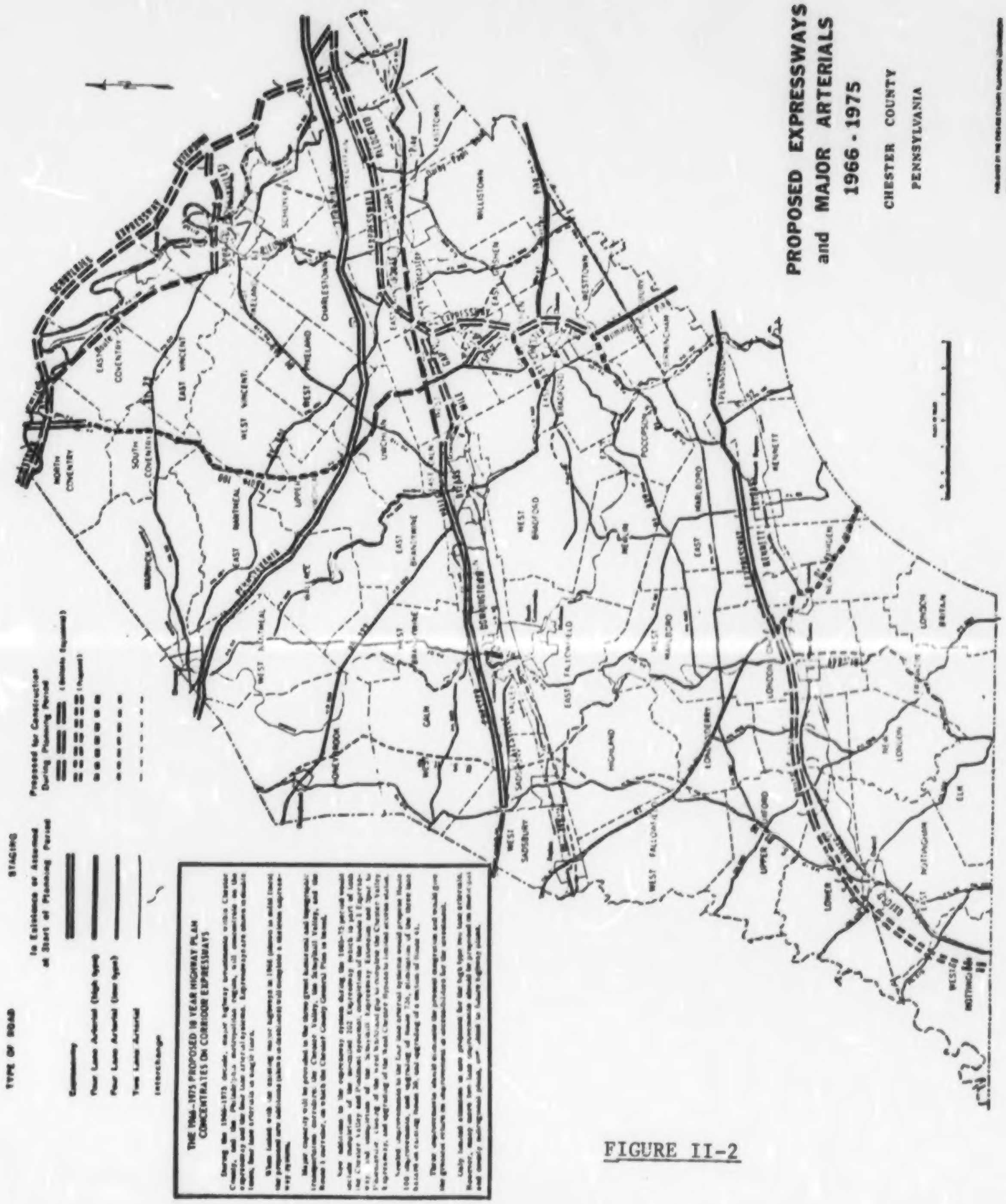
PROPOSED EXPRESSWAYS and MAJOR ARTERIALS
1966 - 1975
CHESTER COUNTY
PENNSYLVANIA
TYPE OF ROAD
STAGING
In Existence or Assured at Start of Planning Period
Proposed for Construction During Planning Period
Expressway
Four Lane Arterial (high type)
Four Lane Arterial (low type)
Two Lane Arterial
Interchange
THE 1966-1975 PROPOSED 10 YEAR HIGHWAY PLAN CONCENTRATES ON CORRIDOR EXPRESSWAYS
NORTH COVENTRY
EAST COVENTRY
SOUTH COVENTRY
EAST VINCENT
WEST VINCENT
WARWICK
EAST NANTMEAL
WEST NANTMEAL
CHARLESTOWN
WILLISTOWN
WESTTOWN
WEST BRADFORD
EAST MARLBORO
WEST MARLBORO
KENNETT
POCOPSON
HIGHLAND
WEST SADSBURY
WEST FALLOWFIELD
UPPER OXFORD
LOWER OXFORD
NEW LONDON
LONDON BRITAIN
ELK
EAST NOTTINGHAM
WEST NOTTINGHAM
PENNSYLVANIA TURNPIKE
SCHUYLKILL EXPRESSWAY
EXPRESSWAY

FIGURE II-2

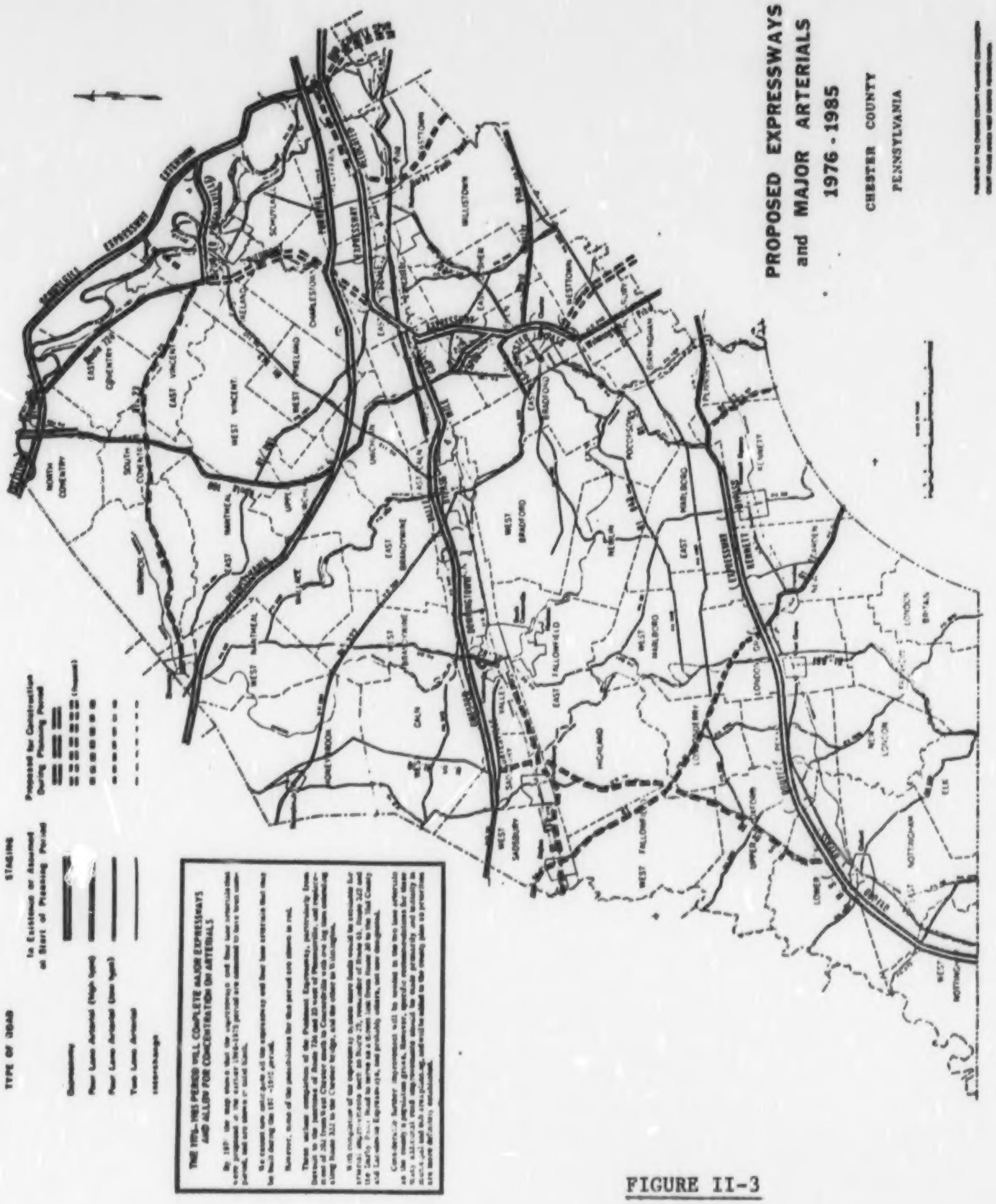
PROPOSED EXPRESSWAYS
and MAJOR ARTERIALS
1976 - 1985
CHESTER COUNTY
PENNSYLVANIA
TYPE OF ROAD
STAGING
In Existence or Assured at Start of Planning Period
Proposed for Construction During Planning Period
Expressway
Four Lane Arterial (High type)
Four Lane Arterial (Low type)
Two Lane Arterial
Interchange
THE 1976-1985 PERIOD WILL COMPLETE MAJOR EXPRESSWAYS AND ALLOW FOR CONCENTRATION ON ARTERIALS
SCHUYLKILL EXPRESSWAY
EXPRESSWAY
NORTH COVENTRY
EAST COVENTRY
SOUTH COVENTRY
EAST VINCENT
WEST VINCENT
EAST NANTMEAL
WEST NANTMEAL
SCHUYLKILL
CHARLESTOWN
WILLISTOWN
WESTTOWN
EAST BRADFORD
WEST BRADFORD
EAST BRANDYWINE
WEST BRANDYWINE
EAST FALLOWFIELD
WEST FALLOWFIELD
HIGHLAND
WEST SADSBURY
HONEY BROOK
WALLACE
UWCHLAN
POCOPSON
EAST MARLBORO
WEST MARLBORO
NEWLIN
KENNETT
NEW GARDEN
LONDON GROVE
LONDON BRITAIN
FRANKLIN
NEW LONDON
ELK
EAST NOTTINGHAM
WEST NOTTINGHAM
LOWER OXFORD
UPPER OXFORD
LONDONDERRY
PENNSBURY
BIRMINGHAM
EAST GOSHEN
WEST GOSHEN
WEST WHITELAND
UPPER UWCHLAN
VALLEY
SADSBURY
CALN
DOWNINGTOWN
KENNETT SQUARE
WEST CHESTER

FIGURE II-3

Mass Transit

The Chester County Planning Commission has these comments concerning future commuter service in the Chester Valley and Schuylkill areas:

> "The Southeastern Pennsylvania Transportation Authority (SEPTA) and the Chester County Commissioners with state and federal aid have been supporting improved service on the Schuylkill Corridor and on the Chester Valley Main Line.... Major stations (for high speed service) are proposed for...the existing Paoli station, Frazer...Exton on the main line and Phoenixville...on the Schuylkill line. Local service to Philadelphia will continue hopefully with improved silverliner equipment and expanded station parking.... The improved service should greatly improve access to central Philadelphia (etc.)...."
>
> "Early in 1972 SEPTA received a $1.5 million Federal grant for more specific studies of public transit throughout its service territory. These studies will attempt to provide a range of alternatives that might give policy leaders a better idea of the benefits from various levels of transit investment, and the ultimate role of public transit in the region.
>
> "Hopefully this study may investigate long standing public transit needs of Chester County including the following high priority projects:
>
> "1. Better Through Service by Both Rail and Bus from West Chester to Central Philadelphia - There is great need to reduce the travel time from West Chester to central Philadelphia from its present over one hour and 50 minutes or less and to eliminate the need to change vehicles at Media or at 69th Street.
>
> "2. Preservation of Service on the Octorara (Route 1) Branch of the Penn Central Railroad - the 1971 floods resulted in the washing out of several bridges and the total abandonment of the existing freight service on the Route 1 branch.
>
> "The Route 1 Railroad is believed to be very significant to the future of southern Chester County. Extensive areas of future industrial land have been planned and zoned by the municipalities to take advantage of the rail access.
>
> "Studies are underway as to the future of this line, including the feasibility of an eventual restoration of passenger service on this line. Kennett Square Borough could be only 60 minutes from central Philadelphia and Oxford only 75 minutes."

3. Air Quality

Air quality in the Valley Forge region will be characterized in terms of regional air quality and localized traffic-induced concentrations. An extensive discussion on air quality and its impacts on the Study Area appears in Section V.C. 5, "Impacts on Air Quality", and the following section is qualified by such discussion.

a. Regional Air Quality

Ambient air quality in the Valley Forge region is indicated by the results of existing or recent monitoring programs performed by the State or by technical consultants under contract to the State. The nearest (Commonwealth of Pennsylvania Air Monitoring System) monitor, operated by DER, is located at the National Guard Station, 1046 Belvoir Avenue, Norristown. Additional concentrations were recorded by Valley Forge Laboratories, Inc., under contract to the Pennsylvania Department of Transportation, along the proposed Pottstown Expressway corridor, between Phoenixville and Norristown. Maximum one-hour average concentrations for CO, NO_2, ozone and SO_x, as recorded by the Norristown COPAMS monitors, are tabulated in Table II-6*. Maximum mean concentrations for CO, NO_2, HC, ozone and particulates, as measured along the Pottstown Expressway corridor, are indicated in Table II-7.

Inspection of Tables II-6 and II-7 indicates that neither the one-hour nor the eight-hour carbon monoxide standard was exceeded, or even closely approached at any of the monitors. However, it is apparent that the one-hour photochemical oxidant standard was exceeded on at least seven different days at the Norristown COPAMS monitor, the highest concentration being 0.163 ppm. Similarly, the primary standard for particulate concentrations was exceeded during one 8-hour sampling period.

Based on traffic estimates for the Delaware-Chester County sector, as provided by DVRPC (a) and the hydrocarbon emission factors reported by Kircher and Armstrong (b), hydrocarbon emission from mobile sources total 12,380 tons per year, as shown in Table II-8. Inclusion of the hydrocarbon emissions from stationary sources in Chester County, as tabulated by DER, results in total hydrocarbon emissions for the region of 14,565 tons per year. From an analysis of the relationship between oxidant concentrations and hydrocarbon emissions (c), as demonstrated by Figure II-4, it is apparent that the high oxidant concentration of 0.163 ppm (May 11, 1974) requires that emissions be reduced by 53% in order to achieve primary national ambient air quality standards. Hence, annual hydrocarbon emissions must be reduced to 6,850 tons per year.

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*Recorded concentrations of particulates were found to be in error, due to equipment malfunctions.

Total particulate and SO_x emissions for Chester County in 1970 are presented in Table II-9, as obtained from the Pennsylvania State Implementation Plan (d). Inspection of Table II-9 indicates that emissions from major point sources were 17,372 and 53,208 tons per year for particulates and SO_x, respectively, and the emissions from area sources were 12,678 and 12,970 tons per year, respectively. Since neither pollutant exhibited a concentration in excess of the pertinent primary air quality standard, no rollback of emissions is required.

b. Localized Traffic-Induced Concentrations

In order to assess the anticipated impact of heavy traffic conditions on localized concentrations of carbon monoxide, an empirical model (e) was applied to heavily travelled highway links along Routes 30, 202 and 252. Average daily traffic (ADT) data provided by DVRPC are tabulated in Table II-10, which includes the corresponding peak-hour volumes, average carbon monoxide emission factors and the resultatnt one-hour carbon monoxide concentrations at the edge of the highway as determined by Milliken's (e) empirical equations.

Inspection of Table II-10 indicates that the one-hour standards are never exceeded, although carbon monoxide concentrations were calculated to attain 70% of the one-hour standard at the stop light intersection of Routes 30 and 252.

Figure II- 4 Relationship of hydrocarbon reduction to oxidant concentration.

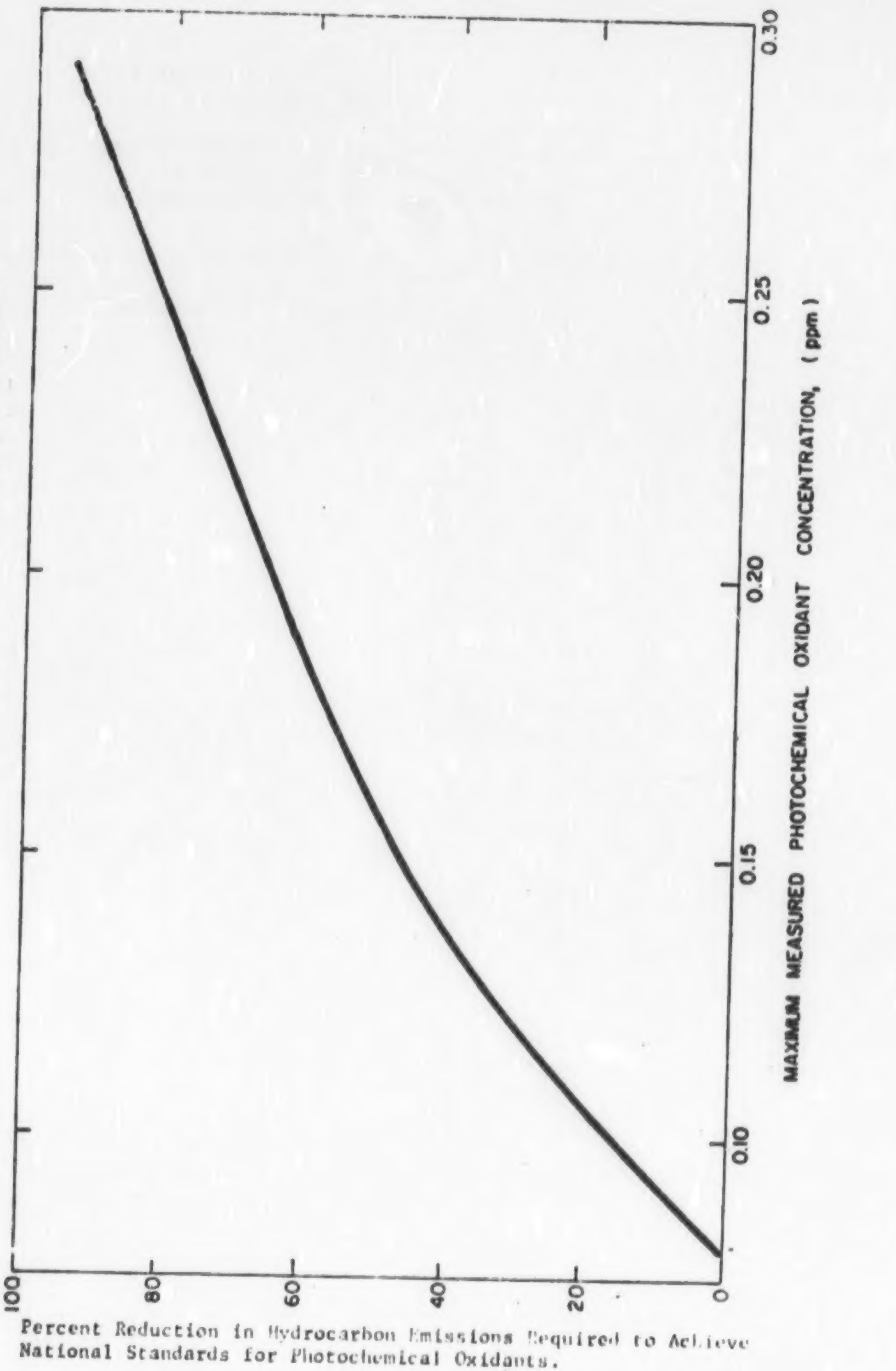


Table II-6

Maximum One-Hour Average Concentrations of SO_x, Ozone, NO_2 and CO at the COPAMS Monitor in Norristown, Pa.

Date (1974)	Concentration (ppm)			
	SO_x	Ozone	NO_2	CO
April 11	0.014	0.067	0.064	2.4
12	0.012	0.063	0.056	1.6
13	0.006	0.074	0.050	3.9
14	0.008	0.062	0.062	4.0
15	0.004	0.057	0.028	0.4
16	0.003	0.049	0.016	0.3
24	0.003	0.031	0.008	0.3
25	0.004	0.069	0.050	1.8
26	0.004	0.084	0.044	1.6
27	0.010	0.070	0.054	2.3
28	0.013	0.109	0.064	2.3
29	0.008	0.104	0.062	1.9
30	0.004	0.102	0.050	3.3
May 1	0.004	0.064	0.026	0.5
2	0.009	0.057	0.044	1.0
3	0.007	0.042	0.046	1.7
4	0.006	0.056	0.042	1.9
5	0.010	0.058	0.044	0.8
6	0.008	0.050	0.048	2.0
7	0.012	0.051	0.040	1.6
8	0.012	0.066	0.048	3.8
9	0.011	0.076	0.070	2.1
10	0.006	0.088	0.056	2.6
11	0.006	0.163	0.058	1.3
12	0.006	0.064	0.046	1.2
13	0.005	0.050	0.054	2.9
14	0.007	0.084	0.056	2.9
15	0.007	0.054	0.038	1.3

TABLE II-7

MAXIMUM CONCENTRATIONS OF CO, NO_2 AND OZONE ALONG THE POTTSTOWN EXPRESSWAY CORRIDOR

MONTH	POLLUTANT							
	CO		NO_2		OZONE		PARTICULATES	
	TEST TIME, HOURS	ppm	TEST TIME, HOURS	ppm	TEST TIME, HOURS	ppm	TEST TIME, HOURS	ug/m^3
July, 1973	8.0	3.5	24.0	0.051	*	0.076	8	242[o]
August, 1973	16.0	3.5	5.5	0.097	"	0.08[+]	"	175
September, 1973	8.0	1.9	6.75	0.080	"	0.06	"	119[o]
October, 1973	7.0	3.4	15.0	0.110	"	0.05	"	91[o]
December, 1973	12.0	4.1	10.0	0.188	"	0.06	"	42
January, 1974	4.5	5.3	7.5	0.174	"	0.06	"	318[o]
February, 1974	7.5	2.4	2.5	0.150	"	0.04	"	196[o]
March, 1974	8.5	1.9	12.0	0.127	"	0.04	"	82

* Single measurement

[+] High reading of 0.22 ppm was discounted as spurious

[o] Measurements obtained in highly industrialized areas northwest of the Study Area, hence are not representative of Study Area air quality.

TABLE II-8

TOTAL HYDROCARBON EMISSIONS FOR CHESTER COUNTY (1974)

TONS PER YEAR

SOURCE CATEGORY	DAILY VMT	cdm	hm	SPEED FACTOR	EMISSION FACTOR	EMISSIONS
1974 LDV	5,130,000	4.4	1.8	0.75	5.1	10,490
HDV	270,000	16.2	5.4	0.75	17.45	1,890
TRANS	5,400,000	--	--	0.75	--	12,380
STATIONARY						2,185
1974 TOTAL						14,565
ALLOWABLE EMISSIONS = 0.47 X 1974 TOTAL						6,850

Definition of terms:

VMT = vehicular miles of travel
cdm = exhaust emission factor
hm = evaporative emission factor
LDV = light duty vehicle
HDV = heavy duty vehicle
TRANS = total transportation

TABLE II-9

TOTAL PARTICULATE AND SO_X EMISSIONS FOR CHESTER COUNTY

(May 30, 1974)

Source Category	Particulate Emissions, Tons/Year		SO_X Emissions Tons/Year	
	Area	Point	Area	Point
Fuel Combustion				
Residential	443	--	2,538	--
Commercial-Institutional	468	21	2,387	120
Industrial	11,180	420	7,585	4,913
Electric Generation	--	491	--	34,199
(Total)	(12,091)	(932)	(12,510)	(40,232)
Industrial Process		3,734		1
Solid Waste Disposal				
Government	--	28	--	5
Residential	51	--	1	--
Commercial-Institutional	7	--	1	--
Industrial	38	--	5	--
(Total)	(95)	(28)	(6)	(5)
Transportation				
Gasoline	383	--	236	--
Diesel	98	--	218	--
(Total)	(481)	(0)	(454)	(0)
Total (Chester County)	12,678	4,694	12,970	40,237
	17,372		53,208	
Total (Metropolitan Philadelphia Interstate AQCR)	235,983	813,514	208,474	745,367
	1,049,497		853,841	

TABLE II-10

EXISTING (1972) PEAK HOUR CO CONCENTRATIONS ALONG HIGHWAY LINKS IN THE VALLEY FORGE AREA

Highway Link	ADT	Peak Hour VPH	Emission Factor	CO Concentration
Route 202, Great Valley	22,000	2,200	52 GPM 74.1 GPM	4.9 ppm
Route 202, Devon	29,000	2,900	52	5.2
Route 202, King of Prussia	45,000	4,500	52	14.5
Route 252, North of 30	15,000	1,800	59	8.1
Route 252, South of 30	13,000	1,560	52	4.6
Route 30, Paoli	22,000	2,420	74	5.5
Route 30/252 Intersection	34,000	3,730	100	28.0

Definition of terms:

ADT = Average daily traffic
VPW = vehicles per hour
GPM = grams per mile

4. On-Lot Sewage Systems

a. Background

The provision of sewer service in the Study Area raises some fundamental issues of general applicability to any suburban municipalities, which deal with past assumptions underlying land use and suburban development patterns.

In the period following World War II, tracts of single family homes were built in suburban areas at densities of more than four units to the acre, relying upon on-lot facilities to dispose of domestic waste water. At the same time, homeowners unused to the proper care of on-lot sewage disposal systems bought automatic washers, dryers and dish washers, installed garbage grinders in their sinks and employed strong detergents which weakened or destroyed the anaerobic bacteria which were relied on to complete the digestive process of the sludge. These practices have shortened the life span of on-lot systems, and it was soon found that the soils could not absorb these wastes. Two obvious answers were proposed: (1) increase lot size and (2) use percolation tests of the soils to determine the absorptive capacity of the soils.

The first choice is of course no help for existing development. As a criterion for development planning, it has increased suburban sprawl, consumed vast land areas and created a dependency on automobiles for accessibility to jobs, shops, homes and other facilities. The resulting vehicle miles of travel as pointed out in this EIS degrade air quality (See Section V.C.5, "Impacts on Air Quality".)

With this background, it is not surprising that the communities participating in the Valley Forge System have for several years been experiencing an increasing number of malfunctioning on-lot sewage systems. However, such problems are only one of the more conspicuous symptoms of the serious overall situation in the Study Area. The Valley Forge Waste Water Treatment Project must address a long term solution to water (and air) quality problems, with on-lot septic facilities problems prevented rather than merely alleviated or relieved.

As is discussed in appropriate sections of this EIS, the characteristics of soil types, slopes, groundwater levels and underlying rock structures for the area determine locations where on-site systems cannot be built at all without the likelihood of system failure, groundwater or stream pollution, or subsidence and collapse. These conditions prevail in many parts of the Study Area, including, not surprisingly, areas where on-site systems have recently been showing a pattern of consistent failure (see Plate A).

For example, compare Plate 2 to Plate 10. Any long range plan for handling sewage in a satisfactory way must not only provide relief from present failing systems, but also insure that no more on-lot systems are installed in areas that cannot support them. Correspondingly, areas which can support such systems at low densities and larger drain fields should be preserved.

Notwithstanding the above, malfunctioning on-lot septic systems remain a clear indication of the severity of the immediate problem, and affected areas must be among the first to receive sewers under the proposed system.

b. Reporting Problems

Data as to the failure of on-site systems was obtained from the Chester County Department of Health records and from municipal sources. Unfortunately, making really accurate determinations of the number of failures is a difficult task for several reasons.

The Chester County Health Department (Appendix 2, Exhibit 4) has acknowledged its problems in tabulating failures due to a lack of reporting by residents. The Department becomes aware of malfunctioning systems only if either a complaint is filed or a permit is requested to repair or replace a system. A resident often does neither. He may choose to have his sewage pumped if it is cheaper than making repairs, especially if sewer installations in the neighborhood are expected soon so that he would be paying for both repairs and a sewer connection in a short space of time. He may also fail to file a complaint if he thinks it would accomplish nothing or might force him to take action about the problem. Finally, some systems which are in fact failing will not be noticed, since in the limestone areas particularly, sewage will seep down, polluting groundwater or leading later to subsidence without any immediate local effect.

The Board of Supervisors of Tredyffrin, in another approach (Appendix 2, Exhibit 3), estimated the number of failing systems by contacting professional cesspool cleaners. Their results, shown in a map accompanying the letter, indicate over 700 sites where 2,100-gallon loads of sewage were pumped over a two-year period; however, since only four of the ten or more cleaners were contacted the number of malfunctioning systems may well be more than twice what is shown. Again, some parts of Tredyffrin are on the limestone substratum so that some leaks flow "away" undetected.

Accordingly, estimates of the number of malfunctioning systems based on specific reports are thus likely to be well underestimated. It is also reasonable to assume that in an area where "many" failures are reported, most if not all units in the area may be expected to fail in the near future.

Table II-11 presents an estimate of the actual number of malfunctioning on-site disposal systems in the Study Area and in the Initial Service Area to be served by the proposed project. The number of malfunctioning on-site units is estimated following the warning guidelines above. Municipal figures are used where available; where they are not, County Health Department values are multiplied by ten, the factor roughly by which municipal figures exceed Health Department figures when both are available. These estimates are still likely to be low, even as a measure of the present situation, and the situation will probably worsen before relief is obtained. Plate 2, compiled from the Health Department data merely identifies the general location of problem areas, and is no measure of the severity of the problem.

The number and percent of malfunctioning units to be served initially was determined in the Draft EIS by counting the blue dots in Plate 2. Having no more detailed information available as to the distribution of units, the same ratios have been used except where otherwise specified. The values given in columns 5 and 6 are thus little more than best "guess estimates", except in cases like Malvern, which is compact, clearly contained entirely within the Initial Service Area, and there is no reason to think that any residence will remain unconnected to the sewer lines once they are available.

Consideration of the table and plates suggests that, subject to the caveats raised above, the proposed project will "catch" most of the serious malfunctions in the Study Area.

Presumably this result was built into the original engineering and design of the project, since the areas involved can be identified rather easily; however, this result even if accomplished is problematic for a variety of reasons.

First, there is no provision for areas of on-lot failure in parts of Chester County outside the Initial or Design Service Areas. The overall structure of the proposed project was designed to catch some areas and not others. Very little discussion is provided here or elsewhere as to whether alternative project designs might service these areas as well as the present one and handle others as well. Instead, discussion centers around extending particular lines to particular groups of houses; although such decisions are important, there are larger issues at stake.

TABLE II-11

MALFUNCTIONING ON-SITE DISPOSAL SYSTEMS IN DESIGN SERVICE AREA

	1[1]	2[2]	3	4	5	6	7
			Malfunctions				
Municipality	No. of Residences	No. to be Served	Municipal Data	Health Data	No. Used	No. to be Served	%
Charlestown	611	132	-	17	170	100	59
E. Pikeland	1,222	851	500	35	500	410	82
Easttown	2,523	1,735	75	62	100	70[2]	70[3]
E. Whiteland	1,679	1,576	983	42	983	970	99
Malvern	837	800	119	35	119	345	99
Schuylkill	1,621	1,361	-	49	490	390	80
Tredyffrin	2,893	2,600	700	69	700	660	95
Willistown	2,570	1,542	-	79	790	370	48
Total	13,956	10,597	-	388	3,852	3,315	86%

1. Number of residences determined from 1970 Census Tract data excluding West Pikeland and West Vincent which are not in the Initial Service Area.

2. Source Table III-9, "Population to be Served by Valley Forge Sewer System: 1970 in Design Service Area".

3. Percent services lowered for Easttown Township based on evidence that problems in area south of service area are more relatively severe than indicated. (See App. 2, exhibit 2.)

Second, sewers have not been planned for immediate construction for certain areas which are situated within the Study Area and have immediate problems. The most striking case is the southern portions of Willistown and Easttown Townships, in the lower basins of the Crum and Darby Creeks, where under the present design the amount of pipe and pumping stations needed and the present low density of development make sewers "uneconomical" (letter from Willistown Township Municipal Authority, Appendix 2 Exhibit 1). The area is typical of one where malfunctions if present can be expected to deteriorate from an already unpleasant state, whether or not an immediate "health hazard" is present. The density (one-acre to one and a half acre lots) while not high is certainly not rural, and more lots this size are expected to be developed. If so, density would even if soil conditions were better than they are, quickly exceed capacity. Rather than decide not to build sewers because they are uneconomical, it would be preferable to seek an alternative plan which would be most effective, or perhaps to encourage appropriate development through planning or zoning, which would make sewering of that area unnecessary.

A third type of problem is presented in western Charlestown Township, outside the Initial Service Area but within the Study Area. Population density is low, the few residents are scattered across the region, and reported on-lot unit failures have been few. Parts of the area also fall into soil categories which suggest that on-lot units can be maintained at two-acre or more lot densities. The area does not in fact seem to need sewer service immediately. Much development, and in particular development in haphazard "clumps" across the township as is typical when individual large landholders sell to large developers, would result within a few years in high-density "spots" which would require sewering, and probably with piping distances that would be far greater than the present "uneconomical" ones in Easttown and Willistown. It must be noted that in cases like the above, package treatment plants should be discouraged as an interim solution to either type of problem, since at best, they merely transfer pollution from on-site puddles and basements directly into streams which are already overloaded with pollutants.

5. Water Quality

a. Surveys

Several rather detailed surveys of water quality in the Study Area have become available, supplementing the material in the Draft EIS. The new material includes a draft of a detailed study of the Schuylkill River itself, and a series of studies of Valley Creek (VC) and Little Valley Creek (LVC) dating from 1969 and therefore providing some time depth. DER has also adopted water quality criteria for Pennsylvania which designate specific water quality standards for various streams in the area, some of which are shown in the accompanying tables for comparative purposes. Quantitative data is now available for the water quality of several stream areas (A few problems were found in the use of these measurements for comparison, viz, units of measurement were sometimes not specified and varied from station to station and study to study; also certain parameters were measured at some stations and not at others).

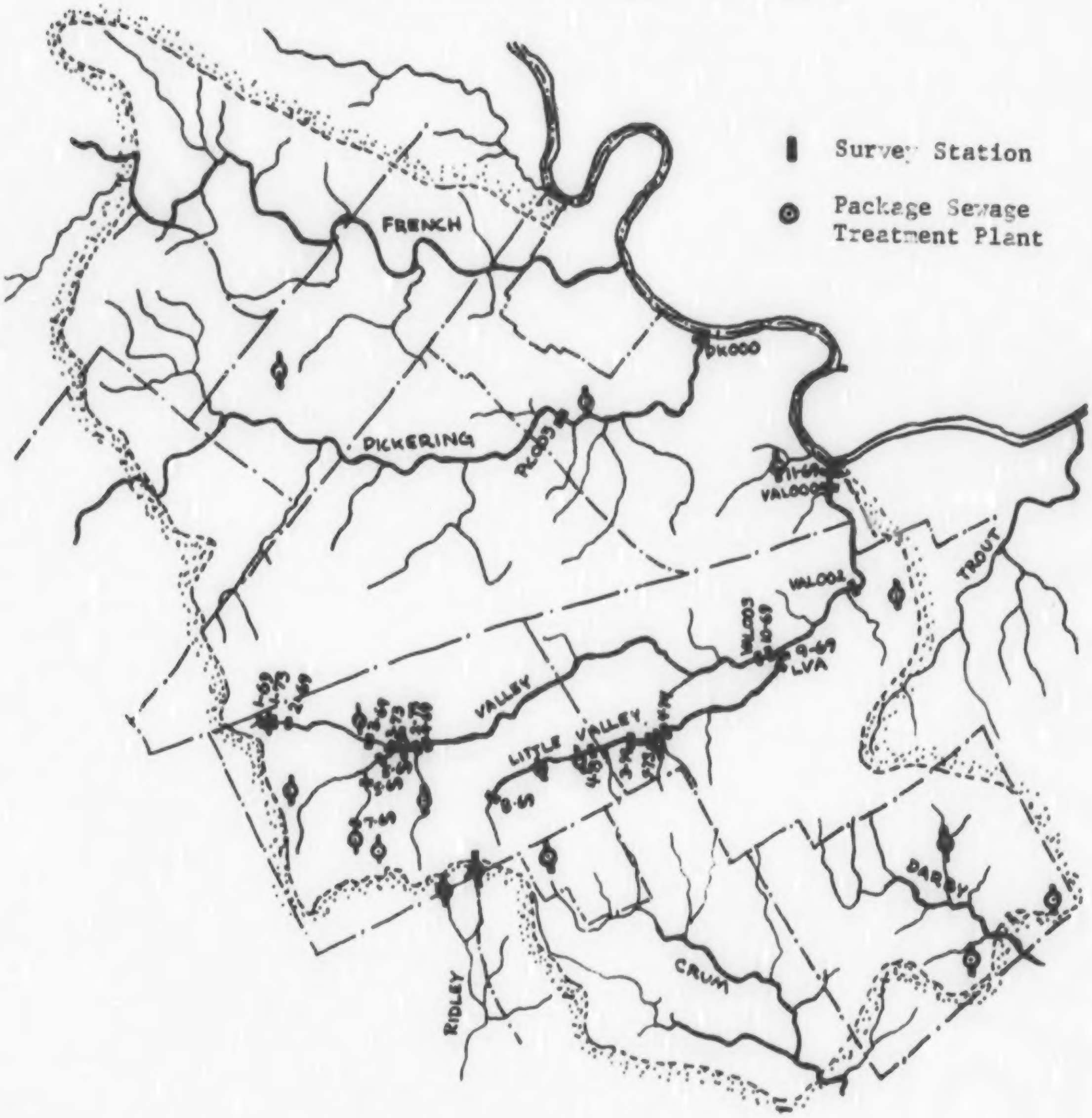
Also, the designers of the Schuylkill River Basin Study and those of most other surveys as well, decided that bacterial counts would add no new information about pollution levels since detailed surveys of higher invertebrates and fishes were to be carried out in any case. This was clearly a reasonable decision; unfortunately, however, most national surveys and many decisions about water uses rely heavily or in some cases exclusively on coliform bacteria counts to determine the extent of sewage pollution. While the latter principle is admittedly arbitrary and has been criticized as such, the present decision does make it hard to compare water quality in the Study Area with that elsewhere. Some bacteria counts are now becoming available through the efforts of groups such as the Chester Valley Sportsmen's Association.

b. Valley Creek and Little Valley Creek

Specific water quality standards are given by DER for the VC Drainage Basin, which includes the greatest concentration of both households and industries in the Study Area. (These standards are fully set forth in the Technical Appendix). The quality of the water as affected by development in the region has been studied at least since 1969, when sampling stations were arranged to measure stream conditions in particular at Malvern Trailer Courts before their private package sewage treatment plant (STP) was installed, and in the area of heavy siltation from highway construction. Samples were taken at 11 stations, upstream and downstream from the trailer court discharge, in the highway construction area, and at other strategic points along VC and LVC. These stations, as well as others discussed below, are shown in Figure II-5 and supplement the survey stations shown on Plate 11. Table II-12 indicates how conditions as measured compare with DER guidelines.

As might be expected, severe effects of organic pollution appeared at the trailer courts, and at the Chester Valley Golf Club where a septic tank was visibly leaking; effects of high iron content were conspicuous in the construction areas. More important, the stream returned only to moderate conditions in the stretches between the specific sources of pollution, and along LVC the effects of at least one specific unknown effluent source could be detected.

LOCATION OF DER STREAM SURVEY STATIONS
AND PACKAGE SEWAGE DISPOSAL PLANTS WITHIN STUDY AREA


Survey Station
Package Sewage Treatment Plant
FRENCH
PICKERING
PK000
PK003
VAL000
VAL002
VAL003
10-69
9-69
LVA
TROUT
VALLEY
LITTLE VALLEY
8-69
7-69
DARBY
CRUM
RIDLEY

- Stations indicated by number and date: DER Surveys, 1969, 1973, 1974
- Stations marked by initials: Schuylkill River Basin Survey, DER

FIGURE II-5

TABLE II-12

WATER QUALITY

	DER Standards	1969											1973					
		DER Water Quality Study Stations																
		1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	4b	5
pH	6-8.5	6.9	7.0	7.1	7.4	7.5	7.5	7.3	8.5	7.4	8.1	8.7	8.2	8.2	8.5	--	7.9	8.0
DO	5.0 mg/1	8.5	8.0	8.8	8.1	8.6	8.6	8.7	7.5	9.5	8.5	8.5	--	--	--	--	--	--
Fe	1.5 mg/1	.8	1.2	3.2	16	10	.8	.4	4	3	15	15	--	--	--	1.2	1.2	1.3
PO_4	.4 mg/1[1]	.5	2.08	1.0	.57	.57	1.43	1.76	0	.57	.14	.29	.83	.95	.23	.36	2.10	2.30
Alkalinity	20 (min.)	38	52	44	72	9.4	152	142	6	100	78	140	45	155	155	--	140	140
Turbidity	150	40	40	130	240	150	20	15	20	--	--	--	--	--	--	--	--	--
Cl	250 mg/1[1]	13	40	8	16	19	39	31	64	41	62	31	290	70	35	65	--	80

[1] Where a standard for the basin is not specified the most lenient of the proposed alternative criteria has been used.

Source: Water Quality Analyses, Department of Environmental Resources, Norristown, Pennsylvania

The study concluded that conditions in VC and LVC were "rapidly deteriorating" even before the installation of the various package STP's that have appeared since 1969.

DER conducted a second survey of this area in January, 1973, with six sampling stations, mostly located at the several STP outfalls now located on VC and LVC. Measurements were concerned primarily with the quality of observed life forms and organic enrichment rather than chemical factors; the values are shown in Table II-13.

Although conditions at the trailer courts may have slightly improved over 1969, they were still described as "marginal" even with the STP functioning. The situation opposite the Great Valley Waste Water plant was a little better. Measurements downstream from the Paoli Industrial Park and the Burroughs STP's, on the other hand, disclosed that the water was in a state of severe toxicity, with high concentrations of heavy metals as well as organic pollutants and ammonia. The streams showed essentially no life forms higher than bacteria in these areas. Furthermore, a sample taken upstream from the Burroughs discharge on LVC showed essentially no life forms higher than bacteria in these areas. A sample taken upstream from the Burroughs discharge on LVC showed heavy industrial contamination as well, indicating that the unidentified source or sources upstream on LVC had increased their effluent output between 1969 and 1973.

The overall picture was that of a river system in serious trouble. The level of industrial effluent treatment was clearly inadequate. Large parts of the stream were approaching a highly eutrophic condition, as evidenced by measurements at station 3, near Route 401 and not at a specific point source of pollution. Here, where siltation from the highway had apparently decreased, eutrophication was evidenced by a mat of algae even in January. VC and LVC Basins were clearly overburdened.

The Draft EIS presented data on organic enrichment, as determined through biological surveys at the stream stations indicated on Plate 11. These were obtained from two studies: The "Valley Creek Watershed Biological Survey" carried out at Conestoga High School under Dr. Ralph Heister, Jr., and a U.S. Geological Survey study under Dr. Bruce Lium. These surveys describe VC and LVC as "moderately polluted" throughout their length, except at Washington's Headquarters where heavy pollution is reported. As can be seen from Plate 11 and Table II-13 the sampling stations provide an excellent supplement for those used in the DER studies. No further details of the nature of the pollution are given.

The Schuylkill River Basin Study, still in rough draft form, was carried out in the summer of 1973. Measurements were made along the Schuylkill itself and at the mouths of most of the significant tributaries, as well as at selected points upstream of some streams.

TABLE II-13

STREAMS SAMPLING STATIONS - LOCATION AND RATING (See Plate 11)

CREEK	LOCATION	STATION NO.	
French	Mouth	4*	HP
French	Above East Pikeland	5	MP
French	Vicinity of Wilsons Corner	6	MP
French		7*	MP
French		8*	MP
Pickering	Above Reservoir	11	HP
Pickering	Between Reservoir and Charlestown	12	MP
Pickering	Vicinity of Charlestown	13	MP
Pickering		14*	MP
Pickering	Headquarters	15*	MP
Valley	Washington's Headquarters	16	HP
Valley	Vicinity of Church Road	17	MP
Valley	Below Knickerbocker Landfill	18	MP
Valley	Above Knickerbocker Landfill	19	MP
Valley	Chester Valley Golf Club	20	MP
Valley	Little Valley Above Confluence with Big Valley	21	MP
Valley	Tributary to Little Valley in Malvern	22	MP
Ridley	Vicinity of County Line	44*	HP
Ridley	Headwaters	45*	MP
Stoney Run		2*	HP
Stoney Run		3*	HP
Perkiomen		1*	HP
Darby	Church	37	MP
Darby	Vicinity of Newtown Road	38	HP
Darby	Vicinity of Newtown Road	23	Clean
Darby	Vicinity of South Leopard Road	33	HP
Darby	Sugartown Road	34	HP
Darby	Vicinity of Berkeley and Arlington Roads	35	MP
Darby	Vicinity of Daventry Road	36	MP
Darby	Vicinity of Lantern Lane	24	MP
Darby	Vicinity of Sugartown Road	26	MP
Darby	Vicinity of South Lancaster Road	27	MP
Darby	Vicinity of Morris Lane	25	MP
Darby	Vicinity of Pilgrim Lane	28	MP
Darby	Vicinity of Lincoln Highway	29	Clean
Darby	Vicinity of Argyle Road	30	Clean
Darby	Vicinity of Sugartown Road	31	HP
Darby	Vicinity of Berwyn Paoli Road	32	HP
Crum		39*	MP
Crum		40*	MP
Crum		41*	MP
Crum	Vicinity of County Line	42	MP
Crum	Headwaters	43	HP

*Sampling stations outside service area.

Reference: Conestoga High School "Valley Creek Watershed Biological Survey".

Unpublished survey conducted by the U.S. Geological Survey under Dr. Lium's direction for Chester County.

Ecological Inventory of Easttown Township under the Administration of the Academy of Natural Sciences of Philadelphia.

HP - Heavily Polluted
MP - Moderately Polluted

VC had sampling stations at its confluence with the Schuylkill and above and below its junction with LVC; LVC was measured above that point as well. It should be noted that these stations are considerably downstream from those of the other surveys mentioned, in an area which was downstream of heavy pollution sources and not heavily developed at the time. The four stations were reported as exhibiting some enrichment, siltation and heavy metal content, but in general stream conditions were considered good and as reflecting improvement from the 1969 and early 1973 situation.

It must be noted, however, that since the stretches of river studied do not overlap, the better quality can be accounted for in more than one way. It may reflect actual improvement of conditions over the whole stream, or merely that in the downstream stretches water quality had time to recover from the effects of upstream sources. Either case is a sign of hope. Parameter values at the four stations fell within the appropriate DER guidelines.

A final set of measurements, taken by DER for LVC in March, 1974, suggest that some slight stream improvement has indeed occurred. The locations of the stations are not given except that the Burroughs STP is included, so a detailed point by point comparison cannot be made. A general look at the data, however, shows no points where quality has deteriorated further, and a few where it has improved. Stream quality, though, continues marginal or worse for upstream VC and LVC, with a remarkable amount of disagreement about the state of the confluence with the Schuylkill.

c. Other Streams

The DER 1973 Schuylkill River Basin Water Resources Survey, and the Conestoga High School and U.S. Geological Survey work, provide some data on other streams in or near the Study Area.

Measured pH for French Creek, upstream from the Study Area, was lower than elsewhere in the Study Area but still within all alternative DER guidelines (no specific standards had been proposed for this stream). Water conditions in lower French Creek were reported by the Schuylkill River Basin Study as fair overall, with some nutrient enrichment and an invertebrate population suggesting that quality varies over a wide range. Fish diversity was high. The Conestoga-U.S. Geological Survey studies reported moderate pollution for VC, again with heavy pollution at the confluence with the Schuylkill.

Pickering Creek had a Schuylkill River Basin station located 3 miles upstream from the confluence with the Schuylkill, as well as the one at that point. At the upstream station located near a proposed YMCA camp, stream conditions were good, though water temperature was rather high. Due to an unidentified source or sources, however, quality degenerated to poor by the lower station; the river at its mouth was described as "black and turbid", with extremely high temperature among other symptoms of a heavily polluted state.

The Conestoga-U.S. Geological Survey studies confirm heavy pollution even above the Pickering Creek Reservoir. Upstream, conditions are somewhat better, but even the headwaters area is "moderately" polluted.

These two studies provide the only available data on conditions in Crum, Darby and Ridley Creeks. Again, the picture is one of moderate enrichment, with a few tributaries reporting clean conditions, but some heavy pollution.

As for the Schuylkill River itself, the DER Schuylkill River Basin 1974 survey reports on the reach from Pottstown to Philadelphia. (These stations are not indicated in Figure II-5). In general, water quality deteriorates steadily as one moves downstream.

Sulfate and phosphate content is high in the lower reaches of the stream, as is that of various metals. Dissolved oxygen levels drop in the summer. The water has been described as having a "consistent yellow or brown appearance and musty or chemical odors."

The following statements from the DER Study emphasize the problems envisioned for the Schuylkill River in the future:

> "In short, this reach of the river now has as its major use that of wastewater disposal.... Most chemical quality improvement methods will have to be instituted within the affected reach. These methods receiving consideration should include dilution, on-stream treatment, and strict control of industrial waste discharges. Again, much of the dissolved mineral content results from natural causes and may be difficult and expensive to control....
>
> "By the year 2020, it is estimated (by FWPCA) that the population in the reach will be 1,120,000. Assuming that 90% of these are connected to sewerage systems, stream flow would have to be approximately 1,600 cfs to maintain the desired BOD maximum concentration. At present, the natural stream flow equals or exceeds this amount only 50% of the time.... The need for advanced waste treatment processes of all types for all discharges in this reach is obvious.... In fact, theoretical computations indicate that the pool behind Plymouth Dam has potentially the worst water quality of any portion of the entire river". (Plymouth Dam is 11 miles downstream of the proposed Valley Forge treatment plant site).

The report concludes in part: "From the vicinity of Berne to Fairmont Dam, the major stream water quality problems at present are caused by municipal and industrial waste water discharges and the residual effects of acid mine drainage. Depressed DO's (dissolved oxygen), high BOD concentrations and high coliform counts are common. Even with... 90 to 95% BOD and solids removal... by the year 2020... (the projected discharges)... will heavily burden and during significant periods, overwhelm the river's waste assimilative capabilities."

In conclusion, water quality in the streams of the Study Area seems to be at a critical point. On the one hand, streams in areas not yet heavily built up seem to be in fairly good condition, meeting DER standards and supporting a variety of fish and other fauna. On the other hand, where extensive municipal and in particular industrial buildup have occurred and private STP's are in use, stream quality is badly deteriorated. It would be overly optimistic to say that polluted conditions exist only in the immediate vicinity of specific outfalls. We are fortunate that none of the area streams as a whole can be described as having "waste assimilation as its primary use," as the lower Schuylkill has often been described. But it is quite clear that the streams in the Study Area are now receiving far more waste than they can assimilate while maintaining other uses for very much longer. In particular, present STP's do not seem to be capable of reducing effluent to a level which will allow stream quality to be maintained under even current levels of development.

6. Use of Package Sewage Treatment Plants (STP's)

The FWPCA provides for issuing effluent guidelines which would require privately owned sewage treatment plants to achieve, among other things, "best practicable control technology" by July 1, 1977. In particular, in a water quality area such as the Study Area, the level of treatment must be at a "level necessary to meet water quality standards." The following discussion demonstrates the extent to which the Study Area now falls short of these standards.

The Study Area at present contains a variety of industrial and institutional "package" STP's, as well as interim private and municipal domestic plants. Lists of these are given in Tables II-14 and II-15, and their locations shown in Figure II-5. These lists were compiled from data collected from the Chester County Master Sewer Plan, municipal authorities, DER's Norristown Office and field surveys. The tables locate the individual plants by township and by stream which receives the treated effluent. Information where available is given as to design population and maximum and current average flow rates, in gallons per day. The lists are not necessarily inclusive.

INDUSTRIAL AND INSTITUTIONAL SEWAGE TREATMENT PLANTS

TABLE II-14

Name	Township	Type	Rec. Water	Des. Pop.	GPD Max/Flow	FPD Avg. Flow	FOUND Unsatisfactory
Appalachian Stones	E. Whiteland	*	VC	*	*	*	4/73
Bishop Tube	E. Whiteland	*	*	*	*	*	4/73
Burroughs	E. Whiteland	Ex. Aer.	VC	1206	126,000	100,000	5/74
Burroughs	E. Whiteland	Ex. Aer.	LVC	*	*	25,000	5/74
Camilla Hall	E. Whiteland	Trickling Filter	VC	250	56,000	38,000	5/74
Devault Pkg.	Charlestown		Quarry	*	*	*	
Foote Mineral	E. Whiteland	*	*	*	*	*	
Freedom's Found.	Schuylkill	Ex. Aer.	Jug Hollow	351	32,400	20,000	5/74
DiFrancesco	Charlestown	*	Pickering	*	*	*	
G.V.H.S.	E. Whiteland	Ex. Aer.	VC	1500	61,000	40,000	5/74
G.V. Meat Mkt.	Tredyffrin	*	*	*	*	*	
Gulf SS(TPK)	Tredyffrin	Ex. Aer.	*	1210	86,000	70,000	
Highway Mat.	E. Whiteland	*	VC	*	*	*	4/73
Immaculata	E. Whiteland	Spring Filter	VC	475	72,000	50,000	5/74
James Spr & Wire	E. Whiteland	*	*	*	*	*	4/73
Knickerbocker Landfill	E. Whiteland		VC				4/73
Matthey Bishop	Malvern	*	LVC	*	*	*	
Natl Pre/ Cast	E. Whiteland	*	VC	*	*	*	4/73
Natl Rolling Mills	E. Whiteland	*	LVC	*	*	*	4/73
Paoli Ind. Park	Tredyffrin	Contact Stabiliz.	LVC	440	45,000	24,000	5/74
			*	*	*	*	
Pickering Ind. Park	Uwchlan	Ex. Aer.	Pickering Pine	1300	13,000	110,000	5/74
Phila. Elec.	E. Pikeland	*	Pickering	*	*	*	4/73
R. H. Carr	E. Whiteland						
Road Machinery	Unknown	*	*	*	*	*	
Villa Maria Acad.	Willistown	*	Crum	*	*	*	
Warner Co.	Tredyffrin	*	VC	*	*	*	
Warren Cedar Hollow	E. Whiteland	*	VC	*	*	*	4/73
Wm. Munroe	Easttown	Septic Tank Sand Filter	Darby	6	900	700	5/74
			*	*	*	*	
Richardson Ind.	E. Whiteland	*	*	*	*	*	4/73
Roberts Pkg.	E. Pikeland	*	*	*	*	*	DER SRB,73 Station (1.)
Wyeth Labs	E. Whiteland	*	LVC	*	115,200	94,000	5/74
	TOTALS				724,500	574,000	

*Unkn

MUNICIPAL AND PRIVATE DOMESTIC INTERIM TREATMENT PLANTS

TABLE II-15

NAME	TOWNSHIP	TYPE	REC. WATER	DES. POP.	MAX/FLOW	AVG. FLOW	FOUND UNSATISFACTORY
C.N.Agnew Apt.	Malvern	Tert.Ex.Aer.	LVC	536	900		5/74
Coastland	E. Whiteland	Ex. Aer.	Yost	890	2,000	1.600	5/74
Devon System	Easttown	*	*	330 EDU		240,000	4/73
G.V.W.W.C.	E. Whiteland	Ex. Aer.	VC	3200	800,000	600,000	5/74
James Overstreet T.C.	Schuylkill	*	*	*	*	*	4/73
Codderback Rd.	Easttown	Ex. Aer.	Julip Run.	25	10,000	7,000	5/74
Malvern T.C.	E. Whiteland	Ex. Aer.	VC	360	55,000	40,000	5/74
Phoenixville T.C.	Schuylkill	Ex. Aer.	Pickering	378	56,700	40,000	5/74
V.F.Pot.HouseRd.	Schuylkill	Sand Filter	*	377 EDU	*	130,000	4/73
Westgate Util.	E. Whiteland	Aer.	LVC	496	14,800	11,000	5/74
Wm. Henry Apts	E. Whiteland	Ex. Aer.	Ridley	985	175,000	120,000	5/74

Dates indicate date when report was examined at DER, Region I, Norristown Office.

*Unknown

The flow rates given in Table II-14, "Industrial and Institutional Sewage Treatment Plants", represent gallons per day (gpd) which will presumably be handled eventually by the proposed sewage treatment system, in addition to domestic effluent from the sewered areas. Flow figures are in general not readily available; note that the total given here includes fewer than half of all the STP's listed, and not necessarily all the largest. A figure of 1,000,000 gpd as an average total flow would probably be a more accurate figure for 1973, though likely still an underestimate.

The total flows in Table II-15 , "Municipal and Private Domestic Interim Treatment Plants", have of course already been included in estimates of total sewage flow generated by the population of the Study Area.

The last column of both tables indicates whether the treatment provided at each STP has been found unsatisfactory in some respect. Data was obtained from the DER Water Quality Management Information System (WAMIS) Addendum, Norristown Office, in April, 1973 by researchers for the Draft EIS and in May,1974 for the present study. Several plants were cited in both surveys; there are likely other violations which appear as formal complaints rather than on the WAMIS listing.

It can be seen that none of the interim domestic and municipal plants has consistently operated in a satisfactory manner. That is, all have discharged loads of BOD, phosphates, chlorides or other pollutants into receiving waters at levels significantly higher than allowed. Industrial and institutional plants have a similar record: essentially all plants for which any data is available are or have been in violation of standards. For the former, these violations often result in streams receiving quantities of substances such as iron, heavy metals or toxic wastes, as well as the more usual pollutants.

Table II-16 summarizes a series of measurements taken in the course of the Schuylkill River Basin Survey mentioned earlier. These are the results of a series of "grab" and "composite" samples of effluent flows at selected STP outfalls. A grab determination of pollution levels is made from a single sample; a composite one uses an average value determined from several samples. The locations of these sampling stations are shown in Figure II-5 along with the stations for the other surveys discussed elsewhere. Where available, and included in Table II-16 are measurements showing stream quality approximately 100 yards downstream from the outfall in question; these values are taken from DER's 1973 study.

Table II-16 also gives the water quality criteria specified by DER for each of the parameters measured. Where a criterion has not been specified for a particular stream, the most lenient of the alternative standards has been used for comparison.

TABLE-II-16 - Water Quality

	DER Standards mg/1.	Paoli Grab	Paoli Comp	1973 Station 5	Wyeth Grab	Wyeth Comp	Burroughs Grab	Burroughs Comp	1973 Station
pH	6-8.5	6.4	7.2	8.0	7.3	7.4	7.2	7.4	--
Alk.	20 (min.)	130	95	140	19.0	155	130	135	--
Fe	1.5	7.15	.28	1.3	--	--	.05	.01	1.2
SO	250	72	--	--	--	--	--	--	--
Mn	1.0	1.0	.06	--	--	--	--	--	--
Cl	150	130	60	80	175	170	60	60	65
Po	.3	2.6	1.4	2.3	3.8	4	3.6	3.8	2.1
Cu	.1	1.56	.65	.12	--	--	.14	.09	.12
Zn	.05	18.5	1.25	.16	--	--	.12	.09	.17
Pb	--	.97	1.05	--	--	--	2.1	.12	.5

DER Standards -

Effluent Samples - SRB Study

Downstream Samples - 1973 DER Study

TABLE II-16 (cont'd)

STP EFFLUENT STREAMS

Great Valley	WasteWater	1973 Station 2	Pickering Ind. Park	Malvern	Trailer Court	1973 Station 1	Phoenixvl. Borough	Phoenixvl. Mob.Homes	Roberts Packing	
Grab	Comp		Grab	Grab	Comp		Grab	Grab	Grab	Comp
7.2	7.0	8.2	7.4	7.3	7.1	8.2	7.4	6.5	7.1	7.3
240	220	155	150	120	130	45	240	85	445	420
335	275	.70	170	290	--	--	65	60	920	550
7.6	6.1	.95	2.4	12.6	11	.83	8.4	2.9	10.3	8.8

It would appear from studies in other areas that the Study Area experience with private STP's is fairly typical. For example, in analyzing data for roughly 90 STP's, obtained from a computerized data file, EPA found that although most of the plants sampled, in fact, indicated acceptable levels of BOD and solids removal, where they reported levels at all, reporting was not consistent and samples were taken infrequently, so that the data could not be verified. EPA has concluded that private STP's can "easily" achieve 90% BOD removal (so that it is presumably appropriate to require them to do so), but that in general, package plants are inadequately operated and maintained.

Other EPA reports consistently stress the finding that operation and maintenance of private STP's is poor, whether this is due to actual deliberate neglect by those in charge or to some other problems in maintaining such processes at reasonable efficiency. A set of operating and maintenance requirements has been proposed, specifying that those in charge (the permit holder under a permitting system):

a. Establish written standard operating procedures and operate the plant at all times as efficiently as possible and in a manner to avoid upsets.

b. Provide an adequate operating staff which is duly qualified to carry out the operation, maintenance and testing functions required to insure compliance with permit conditions.

c. Install sufficient extra treatment capacity and/or auxiliary or "back-up" equipment for essential components of the treatment system which require maintenance or are susceptible to breakdown to insure that permit conditions are at no time violated.

d. Pay the costs for routine on-site inspections of the treatment facilities by a qualified engineer at intervals not to exceed 18 months to assess the overall condition and performance of the plant, and non-routine inspection whenever the plant violates established effluent limitations to determine the causes of the violation and devise techniques to insure its elimination. Reports of all inspections shall be submitted through the permittee to the permitting authority.

e. Meet specified average monthly flow limitations which are in no case to exceed the design capacity of the facility.

(Source: EPA memo, March 28, 1974,"Permit
Conditions for Privately-owned Facilities
Treating Primarily Domestic-Type Waste".)

Obviously, poorly functioning STP's are not the only sources of pollution and enrichment for the streams in the Study Area. This subject has been discussed above. Equally obviously, however, the streams cannot continue to accept STP effluent in the quantities and qualities which are now being produced. (See Section VI, "Conclusions and Recommendations").

III. DISTRIBUTION AND PROJECTIONS OF POPULATION AND ECONOMIC ACTIVITIES

This section serves several purposes. First, an understanding of statistical population growth rates, average family size, percent of the population in minority groups, vacancy rates, median value of housing and the impact of inflation on rents paid by low-income groups, is presented as an essential back-drop to the determination of the socio-economic impact of the proposed action. Second, this section analyzes the shift from single family tract development to multi-family townhouse and apartment development, and its socio-economic causes and statistical rate. Third, growth trends in terms of current development proposals are defined for the future (1985, 2000 and 2020), and population is projected in accordance with the projections of DVRPC and the Chester County Planning Commission. Finally, the history of planning and control of development within the Study Area is traced and the changing concepts leading toward greater public control of the private sector is presented, including an analysis of the regional and county corridor plans, an analysis of the objectives of the local planning process and an objective appraisal of whether present planning and land use controls will meet the new Federal and state environmental objectives.

A. General Population and Housing Characteristics

1. Background

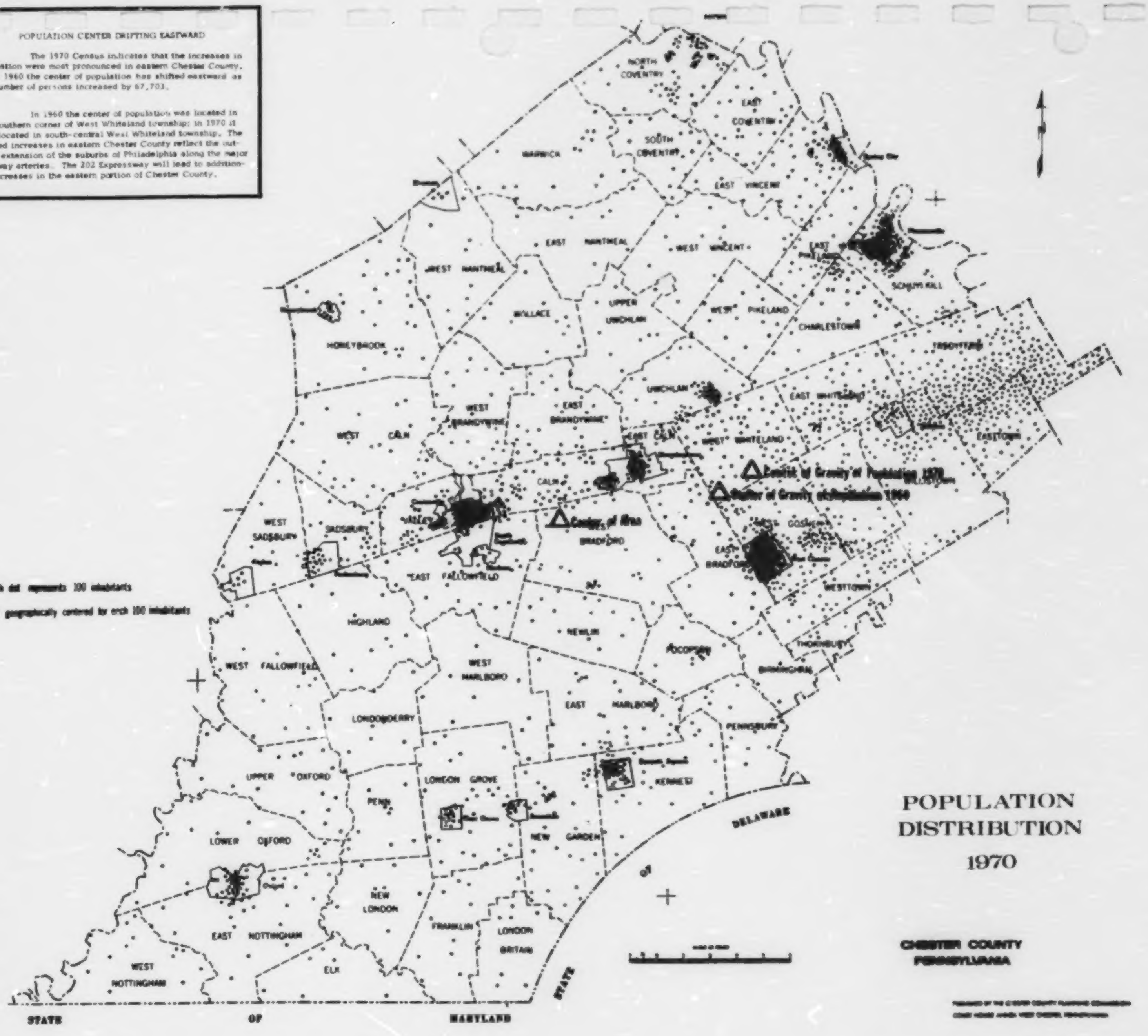
During the past 30 years, Chester County's population has doubled, from 135,626 to 278,311, with more than half of this increase stemming from migration into the County, particularly in the northeastern municipalities comprising the Study Area. From 1960 to 1970, Chester County's population increase was 67,138 residents, which is a 31.8% rate. Figure III-1 indicates the 1970 population distribution within the County and reveals the eastern drift of the center of gravity of population as the northeastern portions continue to grow at a faster rate than the remainder of the County.

Table III-1 shows the major population and housing characteristics of the municipalities comprising the Statistical Study Area, since the impact of the project will be felt to some extent by all municipalities in the area.

POPULATION CENTER DRIFTING EASTWARD

The 1970 Census indicates that the increases in population were most pronounced in eastern Chester County. Since 1960 the center of population has shifted eastward as the number of persons increased by 67,703.

In 1960 the center of population was located in the southern corner of West Whiteland township; in 1970 it was located in south-central West Whiteland township. The marked increases in eastern Chester County reflect the outward extension of the suburbs of Philadelphia along the major highway arteries. The 202 Expressway will lead to additional increases in the eastern portion of Chester County.


NORTH COVENTRY
EAST COVENTRY
SOUTH COVENTRY
WARWICK
EAST VINCENT
EAST NANTMEAL
WEST VINCENT
WEST NANTMEAL
EAST PIKELAND
SCHUYLKILL
WALLACE
UPPER UWCHLAN
WEST PIKELAND
CHARLESTOWN
HONEYBROOK
TREDYFFRIN
UWCHLAN
EAST WHITELAND
WEST BRANDYWINE
EAST BRANDYWINE
EAST CALN
WEST WHITELAND
EASTTOWN
WEST CALN
CALN
Center of Gravity of Population 1970
Center of Gravity of Population 1960
Center of Area
WEST SADSBURY
SADSBURY
WEST BRADFORD
WEST GOSHEN
EAST BRADFORD
EAST FALLOWFIELD
WESTTOWN
HIGHLAND
NEWLIN
POCOPSON
THORNBURY
WEST FALLOWFIELD
WEST MARLBORO
BIRMINGHAM
LONDONDERRY
EAST MARLBORO
PENNSBURY
UPPER OXFORD
LONDON GROVE
KENNETT
PENN
NEW GARDEN
LOWER OXFORD
DELAWARE
NEW LONDON
EAST NOTTINGHAM
FRANKLIN
LONDON BRITAIN
WEST NOTTINGHAM
ELK
STATE OF MARYLAND
STATE OF DELAWARE
N

POPULATION
DISTRIBUTION
1970

CHESTER COUNTY
PENNSYLVANIA

Each dot represents 100 inhabitants

Dot geographically centred for each 100 inhabitants

FIGURE III-1

TABL[illegible] III-1

POPULATION AND HOUSING CHARACTERISTICS 1960-1970 FOR CHESTER COUNTY AND STATISTICAL STUDY AREA[1]

	POPULATION							HOUSING-1970		
Municipality	1970[2]	Difference 1960-1970	Growth in %	Black Pop.	Black as % Total Pop.	Av. Fam. Size 1960	Av. Fam. Size 1970	Total Units	Black Units	% Black
Chester Co.	278,311	67,138	31.8	21,119	7.6	3.5	3.3	80,457	4,946	6.1
Charlestown	3,528	1,597	82.7	234	6.6	3.5	3.5	611	9	1.4
E. Pikeland	4,384	1,567	55.6	27	.6	3.6	3.6	1,222	5	.4
Easttown	9,565	2,658	38.5	238	2.5	3.6	3.7	2,523	67	2.6
E. Vincent[3]	5,084	-369	-7.8	276	5.4	3.3	3.3	954	0	0.0
E. Whiteland	7,242	2,164	42.6	278	3.8	3.8	3.8	1,679	70	4.2
Malvern B.	2,583	315	13.9	162	6.3	3.4	3.1	837	47	5.6
Phoenixville B.[3]	14,823	1,026	7.4	853	5.8	3.4	3.1	4,962	214	4.3
Schuylkill	5,779	2,318	67.0	18	0.3	3.5	3.6	1,621	2	0.1
Tredyffrin	23,404	7,333	45.8	980	4.2	3.7	3.4	7,031	259	3.6
W. Pikeland[3]	1,420	638	81.6	2	.1	3.5	3.4	433	1	.2
W. Vincent[3]	1,890	459	32.1	0	0	3.5	3.4	581	0	0.0
Willistown	9,128	2,636	40.6	250	2.7	3.7	3.5	2,570	50	1.9
Statistical Study Area	88,763	22,342	33.6	3,316	3.7	3.5	3.4	25,024	724	2.9
Statistical Study Area % of County	32%	33.3%	-	15.7%	-	-	-	31.1%	14.6%	-

1. Source: Chester County Housing Analysis, Feb. 1973, pp. 12, 21, 26 and 64, Chester County Planning Commission.
2. Municipal totals as reported by U. S. Census, 1970.
3. Non-participating municipalities.

Tredyffrin Township, one of the ten fastest growing municipalities within the County, accounted for almost one-third of the total 1960-1970 growth in the Statistical Study Area. Easttown, E. Whiteland, Schuylkill and Willistown were also among the largest gainers. As noted by the Chester County Planning Commission, in its February, 1973 report entitled Housing Analysis, "much of the growth in this region can be explained in terms of location on or near the major traffic corridors (U.S. 202, U.S. 30, Pa. 3 and the Pennsylvania Turnpike) which lead to Philadelphia and suggest much of the growth there is due to commutation patterns (i.e., bedroom type development) and urban sprawl." (emphasis added)

Table III-1 shows the black population and black occupied housing units in the Statistical Study Area by municipality. Although the County's black population increased by 3,745 persons from 1960 to 1970, the total black population fell from 8.3% in 1960 to 7.6% in 1970, a drop of 0.7%. In the Statistical Study Area, the black population represents 3.7% of the total population, or roughly half the percentage for the County as a whole. This is probably due in part to the fact that during the 1960's the rate of growth of the black population for the County was substantially less (21.6%) than the whites (32.6%), and the Statistical Study Area was one of the areas of largest growth in the County.

The Commission states that the "demand for housing increased at a rate which was almost 3% greater than the growth in the housing supply. One of the basic indicators of a tight housing market or a housing system in which demand is increasing at a rate greater than that of supply, is a decreasing percentage of housing vacant and available for sale or rent. The percentage dropped from a low 2.0% of all housing in 1960, to an even lower 1.6% in 1970". Usually in a housing market a 1.5% vacancy rate accounts for houses awaiting sale or rental. Thus, the County data for the Statistical Study Area shows a very tight housing supply.

As shown in Table III-1, the average family size in the County has declined from 3.5 in 1960 to 3.4 in 1970; eight of the municipalities shown have experienced a similar decline. A decline in family size leads to a demand for more housing units even if population projections remain the same. These trends in future family size for Chester County are projected by DVRPC to be an average of 3.16 in 1980. These trends are noted here as a factor aggravating the housing shortage; on the other hand with smaller families, there will be more families to share the capital costs involved in sewer service and more families to pay annual sewer rentals.

The existing high demand for housing in the Statistical Study Area is also reflected in the increasing sale price of residential units.

In the County report, Housing Analysis, it is stated that the "value of owner-occupied housing has increased more rapidly than inflation". Table III-2, "Change in Value of Owner Occupied Housing 1960-1970", indicates the percentage increase in the value of owner-occupied housing in Chester County and the Statistical Study Area.

Of the 25,024 in the Statistical Study Area, 24% are rental of which more than one fourth are located in Phoenixville. Five percent are black renter occupied. Table III-3 represents this data by municipality within the Statistical Study Area. Housing Analysis points out that rents in the County have generally increased more than twice as fast as inflation from 1960 to 1970. "The cost of rented housing in Chester County has increased at a rate which is significantly higher than that of owner-occupied housing. Median contract rents for all renter occupied housing increased from $57 per month in 1960 to $100 in 1970, an increase of 75.4 percent". The median gross rental for black rental units increased 63.4%. Within the Statistical Study Area, Table III-4 shows the change in median rents by municipality from 1960 to 1970.

Of particular concern is the economic impact of annual sewer rentals on the low-income renter and homeowner in the Study Area. A special analysis to determine the gross rent paid as a percent of a family's income by income group disclosed that without exception families earning less than $5,000 in 1970 were paying more than 35% of their income for rent, while families earning $15,000 or more in 1970 were only paying 10.5% to 16.2% of their income for rent. It is clear that low-income families pay a disproportionate amount of their income for rent and will be adversely affected economically not only by the initial costs of installing sewers but continuing rental charges as well. These costs will be even more severe in the Study Area due to the rapidly rising rents.

Costs will be still greater if new low and middle-income housing is constructed, scattered throughout the Study Area, in an unplanned haphazard way. Title VI of the 1964 Civil Rights Act requires all Executive Departments and Agencies of the Federal Government to administer their programs and activities impacting housing in an "affirmative" manner and the spirit and intent of the Act provides one more impetus to develop plans for multi-family and other low and middle-income housing and to locate such housing with relatively inexpensive immediate access to sewer lines.

TABLE III-2

CHANGE IN MEDIAN VALUE OF OWNER-OCCUPIED HOUSING FOR CHESTER COUNTY AND STATISTICAL STUDY AREA

Municipality	1970 Tract	$ Median Value	$ Change 1960 - 1970	% Change 1960 - 1970
Chester County	-	21,100	7,200	51.79
Charlestown	3020	30,400	*	*
East Pikeland	3010	21,700	7,200	48.97
Easttown	3002.01	31,200	8,600	38.05
	3002.02	50,000	27,400	121.23
East Vincent	3012	20,700	6,200	42.75
East Whiteland	3021.01	29,100	13,800	90.19
	3021.02	20,300	5,000	32.67
Malvern	3004	16,800	5,500	48.67
Phoenixville	3006	8,900	1,400	18.66
	3007	10,900	2,100	23.86
	3008	15,100	3,200	26.89
	3009	16,300	4,100	33.60
Schuylkill	3005	28,700	11,800	69.82
Tredyffrin	3001.01	44,700	21,100	79.32
	3001.02	47,300	20,700	43.76
	3001.03	26,600	*	*
	3001.04	36,900	10,300	27.91
	3001.05	41,300	14,700	35.39
West Pikeland	3019	33,700	*	*
West Vincent	3018	23,300	*	*
Willistown	3003.01	49,300	30,300	159.47

Source: "Change in Value of Owner Occupied Housing, 1960-1970", Page 75, Chester County Housing Analysis, Feb. 1973, Chester County Planning Commissio

* Information not available in 1960 census

TABLE III-3

NUMBER AND PERCENT COMPARISON OF TOTAL AND BLACK RENTER OCCUPIED HOUSING, 1970 FOR CHESTER COUNTY AND STATISTICAL STUDY AREA

Municipality	#1 Total Renter Occupied	#2 Black Renter Occupied	#3 Percent Black
Chester County	23,392	2,365	10.1
Charlestown	134	1	.7
East Pikeland	161	3	1.9
Easttown	351	27	7.7
East Vincent	185	0	0.0
East Whiteland	260	23	8.8
Malvern	328	19	5.8
Phoenixville	1,661	113	6.8
Schuylkill	220	1	0.5
Tredyffrin	1,959	113	5.8
West Pikeland	80	0	0.0
West Vincent	135	0	0.0
Willistown	487	15	3.1
Statistical Study Area	5,961	315	5.3
Statistical Study Area as a % of County	25.5	13.3	-

Source: "Number and Percent Comparison of Total and Black Renter Occupied Housing, 1970," Page 65, Chester County Housing Analysis, Feb. 1973, Chester County Planning Commission.

TABLE III-4

CHANGE IN MEDIAN RENTS OF RENTER OCCUPIED HOUSING FOR CHESTER COUNTY AND STATISTICAL STUDY AREA

Municipality	1970 Tract	1970 Median Rent	$ Change 1960 - 1970	% Change 1960 - 1970
Chester County	-	100	43	75.43
Charlestown	3020	126	*	*
East Pikeland	3010	110	*	*
Easttown	3002.01	107	21	24.41
	3002.02	172	86	100.00
East Vincent	3012	94	*	*
East Whiteland	3021.01	104	28	36.84
	3021.02	86	8	10.52
Malvern	3004	116	*	*
Phoenixville	3006	71	*	*
	3007	83	19	29.68
	3008	137	*	*
	3009	132	*	*
Schuylkill	3005	112	*	*
Tredyffrin	3001.01	205	133	184.72
	3001.02	118	46	63.88
	3001.03	141	69	95.83
	3001.04	205	133	184.72
	3001.05	171	99	137.50
West Pikeland	3019	115	*	*
West Vincent	3018	108	*	*
Willistown	3003.01	124	*	*

Source: "Change in Median Rents in Dollars for Renter Occupied Housing, 1960-1970," Page 75, Chester County Housing Analysis, Feb. 1973, Chester County Planning Commission
* 1960 census data not available

Since the year a structure was built was reported in both the 1960 and 1970 census, it is possible to compare, for each municipality in the Statistical Study Area, the number of housing units added to the housing stock during the first half and second half of the decade. This data is shown in Table III-5 and indicates that during the first five years (1960-1965), 4,521 units were built, while 3,630 were built during the second five years (1965 - March 1970). The census reports an increase in housing units of 8,151 units in the Statistical Study Area, between 1960 and 1970, representing an increase of 31.1% of the housing units during this 10 year period.

Two other significant points are made by the Chester County Planning Commission. First, data on housing 20 to 30 years old showed "a significant number of units were created" by conversion to "multi-unit structures", substantiating the failure to keep pace with housing demands; and second, the older housing is primarily located in the larger, older municipalities including Phoenixville Borough, as well as Tredyffrin and Easttown in the Statistical Study Area.

Several conclusions can be drawn. The percentage of minority groups, primarily black, living in Chester County (7.6%) is less than the national percentage of 17% for all minority groups and represents an even smaller percentage (3.72%) of the total population in the Statistical Study Area. The Statistical Study Area is still a predominantly "exurban" and rural region, distribution is very uneven, and tends to be concentrated in the older and more densely populated areas of Easttown, East Whiteland, Malvern, Tredyffrin and Phoenixville, and although a significant fraction of the minority residents own their own homes, the percentage is less than that for white residents of the area. Most minority residents in the Statistical Study Area live in communities that are to be sewered by the proposed plan. Field work and study of proposed sewer lines confirms that when the established black communities in particular fall into the Design Service Area, sewer service will be provided.

2. Trends Toward Multi-Family Housing

Chester County, and the Statistical Study Area in particular, have had little multi-family housing outside the urban or early-urban areas of Phoenixville and Malvern. This pattern has begun to change, and can be expected to continue and grow at a rapid rate.

The extent and magnitude of the shift is indicated by the fact that the number of apartments built throughout the country between 1960 and 1970 increased by a dramatic 96.1%.

TABLE III-5

NUMBER AND PERCENT OF HOUSING UNITS BUILT 1960 TO MARCH, 1970 FOR CHESTER COUNTY AND STATISTICAL STUDY AREA

Municipality	1965 - March 1970		1960 - 1964		All Year-Round Housing Units Built From 1960 - 1970
	Units	Percent	Units	Percent	
Chester County	13,281	54.0	11,315	46.0	24,596
Charlestown	72	32.4	150	67.6	222
East Pikeland	178	47.1	200	52.9	378
Easttown	294	37.2	496	62.8	790
East Vincent	142	40.0	213	60.0	355
East Whiteland	256	44.7	316	55.3	572
Malvern	60	38.7	95	61.3	155
Phoenixville	373	57.3	278	42.7	651
Schuylkill	304	38.2	492	61.8	796
Tredyffrin	1,442	46.6	1,652	53.4	3,094
West Pikeland	61	30.5	139	69.5	200
West Vincent	56	46.7	64	53.3	120
Willistown	392	47.9	426	52.1	818
Statistical Study Area	3,630	44.5	4,521	56.5	8,151
Statistical Study Area as % of County	27.3	-	40.0	-	33.1

Source: "Year Structure was Built, Chester County, 1970", Page 94, Chester County Housing Analysis, Feb. 1973, Chester County Planning Commission.

The increased demand for multiple-family units, including high-rise, garden apartment complexes, condominiums and townhouses, results from a variety of factors including:

1. The declining birth rate and shrinking family size.

2. The arrival of suburban industries and other places of employment, which attract blue and white-collar urban workers who seek middle-income housing within reasonable commuting distance of their place of work.

3. The diminution in the size of suburban households including suburban singles, young marrieds, divorced persons, one child families and older couples, the kind of people who used to move back to the city and apparently no longer want to do so or to live in the "big old house" with its burdens, but wish to remain in the same suburban community.

4. The inflationary spiral, which skyrocketed the cost of mortgage money and construction and public improvements, including sewers and other utilities, with the result that single family houses are being priced beyond the means of the average young family. Today and in the future, multi-family housing appears to be the only way to meet the low and middle-income family housing demand in the suburbs. The failure to provide such housing will create communities consisting exclusively of affluent middle-aged parents with teen-age children, without young or old people and municipal employees who will be forced to live elsewhere.

The major obstacle to multi-family housing in the suburbs is the opposition of those who already live there and who move to these areas to get away from the city. To them, apartments mean city. Accordingly, opposition is still strong and the battle is still fought town by town and project by project. The need for apartments and multi-family development, as the statistics make inescapable is gaining over the sentiment against them. In addition to the factors listed above, the effect of long-term shortages of gasoline and home heating oil is causing concern to home buyers. While the impact is still unclear, it undoubtedly will enhance the appeal of multi-family dwellings near mass transit facilities. Housing vacancy rates as we have noted are at an all time low, indicating a tremendous build-up of unmet housing need. Finally, recent state court decisions have struck down as unconstitutional local zoning ordinances prohibiting multi-family homes. If these decisions are upheld, drastic changes can be expected in the ability of the suburbs to exclude multi-family development.

The Statistical Study Area provides a dramatic example of this process at work.

Costs associated with single family homes are rising there as everywhere else. A Philadelphia Bulletin editorial (March 17, 1974) points out that home purchase prices have risen 50% since 1969 in the Philadelphia Standard Metropolitan Statistical Area (SMSA). This rise is primarily reflected in the suburbs. Table III-2 makes obvious the problems of middle-income families in the Statistical Study Area.

Table III-6 (U.S. Census) presents the numbers of housing units in multiple-unit structures in the Statistical Study Area in 1970 and the changes since 1960, leading one to conclude that this recent almost explosive growth in multi-family housing in the Statistical Study Area is likely to continue for some time. This is especially true as more municipalities that have resisted pressure to zone for such construction begin to address housing needs that have grown in severity over recent years.

Such development brings with it all the environmental risks discussed elsewhere in this EIS, including, with regard to sewage disposal, the fact that densities would be far too high to permit any permanent on-site treatment facilities. Since package treatment plants have also proved to be generally unsatisfactory (see Section II.B.6, supra) without careful and comprehensive planning, an apartment or condominium complex could be constructed on a huge scale where sewer service would be extremely costly and certainly delayed.

On the other hand, careful planning that takes into account sewage conveyance and treatment, along with other environmental considerations, can assure that the advantages of multi-family housing are utilized to their fullest potential. Since the demand for housing in Chester County is high enough to assure that new housing construction in the Study Area will certainly continue, site selection becomes crucial. Thus, location of housing in an area where sewers are to be constructed and in close proximity to public transit should be chosen. The side benefits to such a development pattern are the reduction of pressure for highway construction with concurrent reductions of air pollutants.

3. Mobile Homes

Much of the above discussion on multi-family housing applies to mobile homes as well, and the environmental considerations are similar. An alternative to high-density permanent construction, mobile homes were utilized more in Chester County in 1970 than any other county in the Phialdelphia SMSA. Table III-6 includes the number of mobile homes in the Statistical Study Area as of the 1970 Census and the percent of housing units these represented. The figures, though small in the absolute, reflect an 88% increase in the number of mobile homes in Chester County from 1960 to 1970.

TABLE III-6

HOUSING UNITS IN MULTIPLEUNIT STRUCTURES AND MOBILE HOMES FOR CHESTER COUNTY AND STATISTICAL STUDY AREA

Municipality	Housing Units In Multiple Unit Structures 1970	Change Since 1960	Number of Mobile Homes 1970	Mobile Homes As % of Total Housing 1970
Chester County	16,520	9,992	2,563	3.19
Charlestown	45	31	0	.00
East Pikeland	70	7	17	1.39
Easttown	198	71	0	.00
East Vincent	118	58	80	8.39
East Whiteland	123	55	148	8.81
Malvern	295	125	0	.00
Phoenixville	1,362	593	2	.04
Schuylkill	106	61	188	11.60
Tredyffrin	1,788	1,525	7	.10
West Pikeland	28	28	4	.92
West Vincent	29	25	12	2.07
Willistown	289	233	3	.12
Statistical Study Area	4,451	2,812	458	0.57
Statistical Study Area as a % of County	26.94	28.14	17.87	-

Source: Chester County Housing Analysis, pp. 44, 48, Feb. 1973, Chester County Planning Commission.

B. Industrial Development

Industrial development within the Study Area is concentrated in Chester Valley and along the Main Line and Schuylkill River transportation corridors.

The 1974 Chester County Industrial Directory published by the Chester County Development Council provided the most current data on employment and Standard Industrial Classification (SIC) by industry. Analysis of this employement data by municipality is shown below and a detailed list of the firms is shown in Appendix 8. In Appendix 8 the Pennsylvania Industrial Directory list of industries in the Statistical Study Area is presented. This list is less complete than the information shown here.

TABLE III-7

INDUSTRIAL EMPLOYMENT WITHIN THE STATISTICAL STUDY AREA

Municipality	Employees	Percentage	Number of Industries	
			Total	Over 100 Employees
Charlestown	45	.6	2	0
Easttown	8	.1	1	0
East Pikeland	234	3.1	6	1
East Whiteland	3370	44.1	39	6
Malvern	1144	14.9	32	3
Schuylkill	894	11.7	5	3
Tredyffrin	992	13.0	13	4
West Pikeland	24	.3	2	0
West Vincent	1	.0	1	0
Willistown	936	12.2	9	3
	7648	100.0	110	19

Source: 1974 Chester County Industrial Directory

Industries with package sewage treatment plants within the Study Area are identified in the sections of this EIS on water quality. While many industries in the Study Area discharge only domestic wastes, some discharge industrial and noxious wastes as indicated by the effluent samplings conducted by DER in the summer of 1973. These industries will be required to pretreat their wastes before discharging into the sewer system and are required to obtain permits prior to December 31, 1974 in accordance with the National Pollutant Discharge Elimination System (NPDES). On the other hand, industries discharging toxic wastes are required to eliminate such discharges as soon as practical.

In regard to estimates of future industrial growth, efforts were made to obtain projections of employment for the Statistical Study Area. DVRPC reported that previous industrial forecasts had proved unreliable for small areas and revised projections were not available. For purposes of projecting growth in both industrial and institutional effluent, it was conservatively estimated that one third of present flows will be added by 1985 by growth. These estimates increased known flows (package treatment plants) from .6 mgd in 1970 to .8 mgd by 1985.

C. Current Development

In addition to the social and economic changes in population structure which result in shifts to greater demands for multifamily housing, there have been significant changes in the characteristics of builders and the real estate market.

Present day developers in Chester County tend to be much larger than the builders in the late '40's, '50's and '60's. The latter were relatively small building operations limited by highway accessibility and the size of the parcel they could acquire. Today, the almost universal ownership of cars and the construction of freeways both in the Study Area and beyond have "linked" vast rural land areas with much larger land parcels (farms) in the exurbs to places of employment and shopping which have located in King of Prussia and the Chester Valley during the last two decades. The larger developers are looking for inexpensively priced large sites, often buying these outlying farms. Moreover, the marketability of homes once constructed in these exurbs has been assured by the automotive accessibility to jobs and shopping opportunities.

The extent to which these changing circumstances impact the Study Area can be measured in two ways.

First, projects under construction, review or discussion within each municipality in the Statistical Study Area were inventoried. Table III-8 shows the approximate locations, proposed land use, acreage involved, zoning district (lot size) and status of each development as of June 15, 1973. This is a cross-sectional analysis rather than a long-term view.

Note: In Table III-8 the developers in area W-6 are Walsh-Curly and the developer in area W-1 is Dale Reese.

TABLE PROPOSED DEVELOPMENT, BY MUNICIPALITY
STATISTICAL STUDY AREA - JUNE 1973

MAP NO.	PROPOSED USE	OWNER/ DEVELOPER	ACRES	PROPOSED LOTS OR UNITS	ZONING DISTRICT/ LOT SIZE OR DENSITY	STATUS OF PROJECT
CHARLESTOWN TOWNSHIP						
NONE						
SOURCE: HAROLD F. PYLE, CHAIRMAN, BOARD OF SUPERVISORS						
EAST PIKELAND TOWNSHIP						
EP-1	SINGLE FAMILY HOMES	CHARLES E PUSEY, INC.	50±	73 LOTS	R-2 25,000 FT.²	DISCUSSION STAGE (TO BE OFFICIALLY PRESENTED IN A MONTH OR SO)
EP-2	SINGLE FAMILY HOMES	GENE CICCIA	14.3	20 LOTS	R-2 25,000 FT.²	UNDER CONSTRUCTION (2 UNITS BUILT)
EP-3	SINGLE FAMILY HOMES	MID COAST CONSTR. CO.	19.8	24 LOTS	R-2 25,000 FT.²	APPROVED
EP-4	KIMBERTON IND PARK	C. P. DAVIS REALTY CO.	23.5	6	LIGHT INDUSTRIAL	1 LOT ALREADY DEVELOPED
EP-5	LIGHT INDUSTRIAL AREA	JOSEPH CROFT	11.3	3	LIGHT INDUSTRIAL	PROPOSED WILL PROBABLY BE APPROVED
EP-6	SINGLE FAMILY HOMES	JOSEPH PULEO	35	61 LOTS	R-2 25,000 FT.²	28 APPROVED 33 PENDING 4 PRESENTLY BEING BUILT
EP-7	SHOPPING CENTER	PHOENIX HALL	20±	NA	COMMERCIAL	DISCUSSION STAGE
SOURCE: LESTER B. HUGHES, BUILDING INSPECTOR AND ZONING OFFICER						
EASTTOWN TOWNSHIP						
E-1	SINGLE FAMILY HOMES	JOSEPH MULRAY EST.	44±	NOT KNOWN	RESIDENTIAL/1 ACRE	AWAITING SEWERS CAN'T PASS PERC TEST
E-2	SINGLE FAMILY HOMES	BRYN MAWR HOMES	25±	12 LOTS	RESIDENTIAL/4 ACRES	PROCEEDING WITH ON LOT FACILITIES
E-3	SINGLE FAMILY HOMES	CHARLES CRAIG	54±	40 LOTS	RESIDENTIAL/4 ACRES	IN LITIGATION
E-4	SINGLE FAMILY HOMES	CAMPBELL & REED	36±	30 LOTS	RESIDENTIAL/4 ACRES	IN LITIGATION
E-5	PRIVATE COLLEGE	PIERCE JR. COLLEGE	75±	(4-600 STUDENTS)	RESIDENTIAL	IN LITIGATION
E-6	CONDOMINIUM APTS.	HENRY BELBER	3.8	42 UNITS	RESIDENTIAL/21,000	IN LITIGATION
E-7	APARTMENTS	PALMER APARTMENTS		34 UNITS	APT OFFICE/ 19.8-31.2 DU/AC	UNDER CONSTR. W/ON SITE FACILITIES
E-8	PRIVATE ELEM. SCHOOL	EPISCOPAL ACADEMY	35±	(280 STUDENTS)	RESIDENTIAL	PROCEEDING
E-9	SINGLE FAMILY HOMES	CAMPBELL	100±	NOT KNOWN	RESIDENTIAL/1 ACRE	DISCUSSION STAGES
E-10	RECREATION	YMCA	54±	(EXPANSION)	RESIDENTIAL	AWAITING SEWERS
E-11	SINGLE FAMILY HOMES	[illegible]	24±	12 LOTS	RESIDENTIAL/2 ACRES	DISCUSSION STAGES
SOURCE: JAMES KOLSCH, TOWNSHIP MANAGER						
EAST VINCENT TOWNSHIP						
EV-1	SINGLE FAMILY HOMES	FINE BRICKS	60	60 LOTS	2½ A	UNDER CONSTRUCTION
SOURCE: FLORENCE FRANCIS, TWP. CLERK						
EAST WHITELAND TOWNSHIP						
EW-1	INDUSTRIAL	JESSOP STEEL	3.7	NA	INDUSTRIAL	APPROVED, IN PROGRESS
EW-2	SINGLE FAMILY HOMES	H. G. VELPE	67	50-56 LOTS	RESIDENTIAL/44,000 SF	IN PROCESS
EW-3	SCHOOL		30	NA	RESIDENTIAL	FOR FUTURE USE
EW-4	INDUSTRIAL	NATIONAL LIBERTIES	4.6	NA	INDUSTRIAL	APPROVED, IN PROGRESS
EW-5	APARTMENTS	WESTGATE ASSOC.	23.0	237 UNITS	RESIDENTIAL/14.7 DU/AC	PLANS UNDER REVIEW
EW-6	SINGLE FAMILY HOMES	JERRY McKEON	27.1	42 LOTS	RESIDENTIAL/22,000 SF	APPROVED, IN PROGRESS
EW-7	COMMERCIAL	JOHN HORNER	0.5	NA	INDUSTRIAL	UNDER CONSTRUCTION, 2 STORES
EW-8	COMMERCIAL	HEATHKIT, ETC.	0.75 ACRES	5 LOTS	INDUSTRIAL	PLANS UNDER REVIEW
EW-9	SINGLE FAMILY HOMES	DANNA HOMES	37.8	45 LOTS	RESIDENTIAL/44,000 SF	APPROVED, IN PROGRESS
EW-10	APARTMENTS	WILLIAM HENRY APTS.	21.6	261 UNITS	RESIDENTIAL/14.7 DU/AC	COMPLETED
SOURCE: GARY R. LOSS, ADMINISTRATIVE OFFICER						
MALVERN BOROUGH						
M-1	TOWNHOUSES	C. N. AGNEW	9.2	138 UNITS	CHANGED FROM R-2 TO D-4	EXISTING
M-2	TOWNHOUSES	C. N. AGNEW	27.7	288 UNITS	APPROVAL GIVEN TO CHANGE FROM R-2 TO D-4, NOW BEING CONTESTED IN COURT.	
M-3	CONDOMINIUMS	BLACKBURN	3.8	70 UNITS		
M-4	APARTMENTS	MORELLI	9.9	144 UNITS		
M-6	LIGHT INDUSTRIAL	COLONA	13.3	6	LIGHT INDUSTRIAL	UNDER CONSTRUCTION
SOURCE: RICHARD HEATON, BOROUGH MANAGER						
SCHUYLKILL TOWNSHIP						
S-1	SINGLE FAMILY HOMES	HESPORIAN	16	8 LOTS	RESIDENTIAL/R 1/2 ACRE	APPROVAL IS PENDING
S-2	SINGLE FAMILY HOMES	[illegible]	46	46 LOTS	RESIDENTIAL/R 1/2 ACRE	UNDER CONSTRUCTION
S-3	SINGLE FAMILY HOMES	L'ESPERANCE	5.5	3 LOTS	RESIDENTIAL/R 1/2 ACRE	APPROVED
S-4	TRAILER PARK	OVERSTREET	28	110 UNITS	RESIDENTIAL/R 3/4 ACRE	COMPLETELY FILLED (PRESENTLY IN LITIGATION)
S-5	SINGLE FAMILY HOMES	PICKERING VALLEY ESTATES	50	73 LOTS	RESIDENTIAL/0.5 ACRES	UNDER CONSTRUCTION
S-6	SINGLE FAMILY HOMES	SOUTH FORGE MANOR		[illegible]	RESIDENTIAL/R 3/4 ACRE	SUBDIVIDED SINCE EARLY 60's AWAITING SEWERS FOR COMPLETION
S-7	OFFICE BUILDINGS	VALLEY FORGE OFFICE COLONY	5	2	COMMERCIAL	APPROVED
S-8	RECREATIONAL	BAKER PARK/YMCA	60	NA	RESIDENTIAL/R 1/2 ACRE	AWAITING SEWERS
SOURCE: ROBERT HUBER, TOWNSHIP ENGINEER AND ZONING OFFICER, A. R. MARTIN ASSOCIATES						
TREDYFFRIN TOWNSHIP						
T-1	SINGLE FAMILY HOMES	PREMIERE		21 LOTS	RESIDENTIAL/100,000 SF	APPROVED, IN PROGRESS
T-2	SINGLE FAMILY HOMES	R. T. ANDREWS	70±	28 LOTS	RESIDENTIAL/100,000 SF	APPROVED, IN PROGRESS
T-3	APARTMENTS	HANFORD HOUSE	10±	150 UNITS	RESIDENTIAL/12,000/30,000 SF	CANNOT BE BUILT W/O ZONING CHANGE & SEWERS
T-4	TOWNHOUSES	FINELLI HARLEY	3.2	40 UNITS	COMMERCIAL	CANNOT BE BUILT W/O ZONING CHANGE & SEWERS
T-5	APARTMENTS	COLONIAL TOWERS		41 UNITS (125 UNITS EXIST.)	RESIDENTIAL/15 DU/ACRE	APPROVED WITH ON SITE SEWAGE DISPOSAL
T-6	SINGLE FAMILY HOMES			10 LOTS	RESIDENTIAL/100,000 SF	APPROVED, IN PROGRESS
T-7	RECREATION	TREDYFFRIN		NA	COMMERCIAL	IN PROGRESS
T-8	PUD	CHESTERBROOK	878.6 GROSS 800.6 NET		RESIDENTIAL/100,000 SF	SITE HAS BEEN DESIGNATED A UNIFIED DEVELOPMENT DISTRICT BY ZONING ORDINANCE PERMITTING
	SINGLE FAMILY HOMES	FOX COMPANIES	68.6	177 LOTS	RESIDENTIAL/100,000 SF	APPROVAL UPON SINGLE FAMILY PORTION OF PROJECT IN LITIGATION
	TOWNHOUSES	FOX COMPANIES	107.5	1,250 UNITS	RESIDENTIAL/100,000 SF	
	APARTMENTS	FOX COMPANIES	146.3	2,350 UNITS	RESIDENTIAL/100,000 SF	
	OFFICES	FOX COMPANIES	102.0	(1,400,000 SF)	RESIDENTIAL/100,000 SF	REMAINING PROJECT IN DESIGN AND APPROVAL STAGES.
	COMMERCIAL	FOX COMPANIES	20.5	(270,000 SF)	RESIDENTIAL/100,000 SF	
	SCHOOLS	FOX COMPANIES	37.0		RESIDENTIAL/100,000 SF	
	OPEN SPACE	FOX COMPANIES	310.7		RESIDENTIAL/100,000 SF	
SOURCE: JOSEPH A. JANASIK, ASSISTANT TOWNSHIP MANAGER						
WEST PIKELAND TOWNSHIP						
NONE						
SOURCE: BENJAMIN J. SAGESE, ZONING OFFICER						
WEST VINCENT TOWNSHIP						
NONE						
SOURCE: JOSEPH DEMPSEY, VICE CHAIRMAN, PLANNING COMMISSION						
WILLISTOWN TOWNSHIP						
W-1	APARTMENTS	VILLAS OF MALVERN	30.0	300-450 UNITS	OFFICE APARTMENTS/10-15 DU/AC	AWAITING SEWERS
W-2	INDUSTRIAL	[illegible]	2±	NA	INDUSTRIAL	UNDER REVIEW
W-3	OFFICES		2±	NA	INDUSTRIAL	UNDER REVIEW
W-4	NURSING HOME			NA	INDUSTRIAL	DISCUSSION STAGES
W-5	SINGLE FAMILY HOMES	GULF CONSTR CO.	11.0 ACRE	21 LOTS	RESIDENTIAL/12,000 SF	PLANS IN PROGRESS
W-6	APARTMENTS	DALE REESE	30±	600± UNITS	RESIDENTIAL/2 ACRES	IN LITIGATION
W-7	RECREATIONAL	TOWNSHIP	25±	NA	RESIDENTIAL	AWAITING DEVELOPMENT
SOURCE: WILLIAM J. DAVIS, ZONING OFFICER						

TABLE III-8

Analyses of this data by municipality for the participating municipalities show that total acreage involved in current plans - including those plans for commercial, industrial and institutional use, including 344.7 acres for parks, and all residential uses - amounts to 2,142.2 acres. Of this total, 1,654 acres is devoted to residential uses which could house an estimated 7,230 households or roughly 22,000 to 25,000 individuals.

Proposed Land Use	Acres	% of Acres	No. of Households	% of Households
Townhouses and apts.	463.3	28.0	6,171	85.3
Lots under 2 acres	647.1	39.1	678	9.4
Lots more than 2 acres	543.6	32.9	381	5.3
	1654.0	100.0	7,230	100.0

Source: Table III-8.

The above table shows that current development in the Statistical Study Area is strongly weighted in favor of townhouses and apartments, with 85.3% of all household units in this type. Land consumed represents 463.3 acres or 28% of the total proposed residential development area. It should be noted that the townhouses and apartments in the proposed Chesterbrook development, Tredyffrin Township, namely 3,593 units, represent roughly 50% of all those proposed within the Statistical Study Area.

While slightly more than one quarter of the land under current review by the municipalities was devoted to townhouses and apartments, this land will house over six times as many families as will the land devoted to single family tract housing consisting of lots under two acres and more than two acres. These latter categories accounted for 72% of the land area to be consumed while only providing 1,059 units or 15% of the total number of dwelling units.

Second, to obtain a long range view of development forces at work in the Study Area, the major proposed subdivisions and developments reviewed by the Chester County Planning Commission and the County Engineer during the years 1969 to April, 1973 were mapped (See Plate B, "Land Not Developed") and analyzed. The map and tabular data for this period does not provide a complete picture of the years covered since there are significant omissions in the data including (1) subdivisions not submitted for the County review, (2) subdivisions under 45 acres and (3) subdivisions proposed before 1969, and not subsequently, revised. This data was reviewed and projects reported under current review by the municipalities were excluded. These projects were dropped from this list and are not included in the following analysis.

Several conclusions can be drawn:

1. Activity by year fluctuates violently, apparently in response to market forces.

2. 46.8% (937.8 acres) of the subdivided land consists of 55 parcels with an average of 17 acres each. These subdivisions represent division of farms into estate, gentleman farms or division of large properties for heirs, etc.

3. 35.5% (711.7 acres) of land was subdivided into tracts between 2 and 5 acres. This pattern represents the creation of 210 large lots for development. Unless these lots are located on adverse soil conditions, they should not require sewer service.

4. 17.7% (355.0 acres) of land subdivided into lots less than 2 acres represents 584 units in townhouses and 176 homes in single family tract development. (These figures include the first phase proposed for Chesterbrook in Tredyffrin Township involving 112.2 acres and 120 dwelling units.)

Within the Study Area, the County subdivision data showed that 4.3% (2004.4 acres) of the total acreage (47,000 acres) was involved in the subdivisions reported during the four and one-quarter years reported. The subdivision land area was divided into three categories: land subdivided into lots of less than two acres, into lots greater than two acres but less than five, and tracts greater than five acres. A complete list of subdivisions is shown in Appendix 11.

Subdivisions Reviewed by Chester County
Planning Commission and the County Engineer
1969 to April, 1973
(in acres)

Year	Less Than 2 Acres[1]	Greater than 2 acres & less than 5	Greater than 5 acres	Total
1969	73.7	330.1	353.1	756.8
1970	94.7	217.7	35.5	347.9
1971	20.0	47.7	174.0	241.7
1972	146.6	116.2	312.5	575.3
1973[2]	20.0	0.0	62.7	92.7
Total	355.0	711.7	937.8	2004.4
Percent	17.7	35.5	46.8	100%

1. Includes townhouses and apartments. There is very little doubt that these units will require sewer service wherever located.

2. Includes first quarter only.

It should be noted as shown in Plate B, "Land Not Developed" that there are several subdivisions not within the Study Area that are located upstream in the French and Pickering Creek Basins. If these developments are built at densities requiring sewer service, further pollution of the creeks could result and sewer service could be demanded by the future residents that would require sewer extensions which would not be cost-effective.

The Chester County Planning Commission's evaluation of this new development pattern is very much to the point. While it deals with the County as a whole, its remarks demonstrate a deep concern as to the destruction of the County's land, increases in costs of community infrastructure and destruction of environmental quality:

> "Compared to past practice, the recent trends show a much more random scatteration of proposed developments wherever a developer could acquire land. Many of the developments do not seem related to any major community facilities, particularly the county sewerage plan, major highways, or commuter rail facilities, nor to the need to preserve farmland.
>
> "This type of urban sprawl, although initially based upon lower cost land, can be very costly in the long run both to the buyers of the proposed developments, and to the public economy.
>
> "The buyer will often need more cars per family due to the encounter of long drives for almost every need, and have problems of lack of community identity. Urban sprawl means large public costs in such ways as added road maintenance, school buses, postal service, air pollution, unnecessary consumption of limited gasoline supplies, and potential health problems from inability to provide public sewers. And effective agriculture is disrupted by scattered urban development."

Finally, field inspections of a sample of these sites found very little actual construction activity, and, therefore, development proposals reported here probably only represent a commitment of legal and engineering fees, etc., at the present time. The unfavorable economic conditions in the housing market is probably delaying construction; however, if there is an improvement in economic conditions, many of these developments would probably be built.

In total, the "cross-sectional" and "trend" analysis described above accounts for a total acreage within the Study Area of 3,658 acres of 8% of the total. Moreover, the development activity further represents an increase of 8,200 dwelling units, a possible population of 43,788 within the Study Area. (See Table III-12, Study Area Population Projections by Municipality and Drainage Basin: 1970-2000).

D. Population Projections

1. Sub-Regional Projections

Tables III-9, III-10 and III-11 present a series of calculations designed to project a conservative estimate of equivalent population to be served by the Valley Forge sanitary sewer system in the years 1985, 2000 and 2020. These estimates are based on a financial report prepared by VFSA's investment bankers C. C. Collings and Company, Inc., and the municipal population projections of DVRPC for the Statistical Study Area.

Table III-9 coverts Equivalent Residences to be served into Equivalent Population using 1970 household sizes obtained from the 1970 U.S. Census. The number of Equivalent Residences to be served in 1970 in each municipality includes not only the institutional and commercial flows to be connected to the sewer system translated into an equivalent number of residences, but are also translated into Equivalent Population and used as the base (1970) population to be served in Table III-11.

Table III-10 presents 1970 municipal populations and DVRPC projections for 1985, 2000 and 2020 for the Statistical Study Area. These municipal populations are allocated to three drainage sheds, the first two flowing into the Schuylkill River and the third flowing into the Delaware River. Portions of the municipal populations of East Whiteland, Charlestown and West Vincent which are in the Brandywine Basin were excluded. The 1970 population for the Statistical Study Area shown in Table III-1 included Phoenixville (14,823) and the population (565) resident in the portions of the municipalities located in the Brandywine Drainage Basin. Therefore, Table III-1 shows 88,763. Subtracting Phoenixville and the Brandywine population yields a 1970 population of 73,375 used here.

DVRPC's projections were developed on a county level by first projecting the total population and then allocating this total projected population to the individual municipalities in each county on the basis of past growth rates, land accessibility, land availability and local planning. Like all population projections or estimates, the smaller the land area or political unit chosen for estimation, the higher the risk of error.

DVRPC's projections were chosen in lieu of existing Chester County population projections done in conjunction with the County Sanitary Sewer Plan. First, the County projections were prepared in 1967 and thus did not have the benefit of the 1970 Census; second, they were high, particularly for the Upper Main Line municipalities and erratic for the others.

TABLE III-9

POPULATION TO BE SERVED BY VALLEY FORGE SEWER SYSTEM: 1970 IN DESIGN SERVICE AREA

Municipality	Estimated Equivalent Residences To Be Served[2]	1970 Average Family Size [1]	Estimated 1970 Equivalent Population To Be Served [2]
Charlestown Township	132	3.44	454
East Pikeland Township	851	3.58	3,047
Easttown Township	1,735	3.47	6,020
East Vincent Township	-	3.26	-
East Whiteland Township	1,576	3.85	6,068
Malvern Borough	800	3.12	2,496
Schuylkill Township	1,361	3.59	4,886
Tredyffrin Township	2,600	3.51	9,126
West Pikeland Township	-	3.39	-
West Vincent Township	-	3.42	-
Willistown Township	1,542	3.56	5,490
TOTAL	10,597		37,587

Source: 1. 1970 U. S. Census of Population

2. C. C. Collings' Financial Report

TABLE III-10

MUNICIPAL POPULATION PROJECTIONS FOR STATISTICAL STUDY AREA BY DRAINAGE BASIN: 1970-2020

Drainage Basin and Municipality	% Allocated		Population			
	1970	Future	1970	1985	2000	2020
French/Pickering/Stoney						
Charlestown Township	89.2	89.2	3,147	4,951	6,958	9,368
East Pikeland Township	100.0	100.0	4,384	6,559	8,861	11,405
East Vincent Township	100.0	100.0	5,084	5,326	6,383	7,566
Schuylkill Township	75.8	75.8	4,380	6,718	9,127	11,771
West Pikeland Township	100.0	100.0	1,420	2,290	3,194	4,229
West Vincent Township	95.7	95.7	1,809	2,345	3,062	3,828
Subtotal			20,224	28,189	37,585	48,167
Valley/Trout						
Charlestown Township	10.2	10.2	360	566	796	1,071
East Whiteland Township	85.9	85.9	6,221	8,041	9,621	11,598
Easttown Township	2.2	2.2	210	285	362	441
Schuylkill Township	24.2	24.2	1,399	2,145	2,914	3,758
Tredyffrin Township	85.0	98.0	19,836	28,770	37,810	47,188
Willistown Township	3.1	3.1	283	442	605	812
Malvern Borough	41.2	41.2	1,164	1,232	1,382	1,463
Subtotal			29,473	41,481	53,490	66,331
Ridley/Crum/Darby						
East Whiteland Township	7.7	7.7	558	721	862	1,040
Easttown Township	97.8	97.8	9,355	12,689	16,089	19,602
Malvern Borough	58.8	58.8	1,419	1,758	1,972	2,089
Tredyffrin Township	15.0	2.0	3,501	3,683	3,847	4,059
Willistown Township	96.9	96.9	8,845	13,808	18,895	25,388
Subtotal			23,678	32,659	41,665	52,178
TOTAL			73,375	102,329	132,740	166,676

Source: DVRPC

TABLE III-11

FOR STATISTICAL STUDY AREA
POPULATION TO BE SERVED BY VALLEY FORGE SEWER SYSTEM: 1970-2020

Drainage Basin and Municipality	1970 Equivalent Population Served	1. 1985				2000				2020			
		New Population	Served %	Served No.	Cum.Total	New Population	Served %	Served No.	Cum. Total	New Population	Served %	Served No.	Cum. Total
French/Pickering/Stoney													
Charlestown Twp.	454	1,804	50	902	1,336	2,007	75	1,506	2,862	2,410	90	2,169	5,031
E. Pikeland Twp.	3,047	2,175	75	1,631	4,678	2,302	50	1,151	5,829	2,544	50	1,272	7,101
E. Vincent Twp.	—	242	10	24	24	1,057	30	317	341	1,183	50	592	933
Schuylkill Twp.	3,666	2,338	90	2,104	5,770	2,409	100	2,409	8,176	2,644	100	2,644	10,823
W. Pikeland Twp.	—	870	—	—	—	904	—	—	—	1,035	—	—	—
W. Vincent Twp.	—	536	5	27	27	717	10	72	99	766	20	153	252
Valley/Trout													
Charlestown Twp.	—	206	—	—	—	230	300	690	690	275	90	247	937
E. Whiteland Twp.	6,068	1,820	90	1,638	7,706	1,580	100	1,580	9,286	1,977	100	1,977	11,263
Easttown Twp.	—	75	—	—	—	77	—	—	—	79	—	—	—
Schuylkill Twp.	1,220	746	90	671	1,891	769	100	769	2,660	844	100	844	3,504
Tredyffrin Twp.	6,196	8,944	50	4,472	10,668	9,040	75	6,780	16,448	9,378	75	7,033	23,481
Willistown Twp.	1,500	159	100	159	1,659	163	100	163	1,822	207	100	287	2,029
Malvern Borough	1,125	68	100	68	1,193	150	100	150	1,343	81	100	81	1,424
Ridley/Crum/Darby													
E. Whiteland Twp.	—	163	—	—	—	141	—	—	—	178	—	—	—
Easttown Twp.	6,020	3,334	75	2,500	8,520	3,400	90	3,060	9,580	3,513	90	3,162	12,742
Malvern Borough	1,371	339	100	339	1,720	214	100	214	1,934	112	100	112	2,046
Tredyffrin Twp.	2,930	182	100	182	3,112	164	100	164	3,276	212	100	212	3,488
Willistown Twp.	3,990	4,963	75	3,722	7,712	6,087	90	4,579	12,291	6,493	90	5,844	18,136
TOTAL POPULATION SERVED BY YEAR	37,587				56,036				76,637				103,190

Source: DVRPC (municipal projections) and Buchart-Horn (estimate of persons to be served).

1. Table III-9, Col. 3.

The projected population growth for each municipality is entered in Table III-11 where an estimate of new population to be served is made. The estimations of the percent of the new population to be served were based on previous discussion and the following general observations for each community.

French/Pickering/Stoney Creeks

Charlestown Township - Difficult to evaluate, but it must be assumed that the northern portion will be sewered with increasing percentages of service.

East Pikeland Township - High percentage of service, but some service will be to Spring City and possibly some to Phoenixville.

East Vincent Township - Sewer service will come in via East Pikeland and initially serve only a small portion of the township. Even in the long-range, much of its sewer service will be to Spring City.

Schuylkill Township - Only the most remote regions will not be served.

West Pikeland and West Vincent Townships - Little or no growth in sewer service because of costly runs; service from within Chester Springs system or from the west are as likely as from the Valley Forge System.

Valley/Trout Creeks

Charlestown Township - Growth may be delayed here; but when served, mostly all will be sewered.

East Whiteland Township - Initial commitments are to sewer as much of the township as possible.

Easttown Township - None, inasmuch as this area is already served by Trout Run.

Schuylkill Township - As in Pickering Creek, only the most remote areas will not be served.

Tredyffrin Township - Much of the recent growth, has been served by Trout Run; most of the future growth will be served by Valley Forge. Only the northern fringe of the Great Valley is not likely to be served.

Willistown Township - Entire area is in the Initial Service Area; it must be assumed that 100% will be served.

Malvern Borough - Nearly the entire area is in the Initial Service Area; it must be assumed that 100% will be served.

Ridley/Crum/Darby Creeks

Easttown Township - High due to apartments along U.S. 30; future will remain high as southerly areas of the township seem more likely at this time to be served by Valley Forge than by interceptors north from Delaware County.

Malvern Borough - Entire area is in Initial Service Area; it must be assumed that 100% will be serviced.

Tredyffrin Township - It must be assumed that 100% will be sewered.

Malvern Borough - Entire area is in Initial Service Area; it must be assumed that 100% will be serviced.

Tredyffrin Township - It must be assumed that 100% will be sewered.

Willistown Township - High due to apartments along U.S. 30; future will remain high as southerly areas of the township seem more likely at this time to be served by Valley Forge than by interceptors north from Delaware County.

The following points should be remembered when interpreting the total population served in each year as presented in Table III-1. The 1970 Equivalent Population Served includes population equivalency estimates for some industrial, institutional and commercial activities, but does not include industries or institutions which now use package plants and will be required to use these present facilities for pretreatment and in the future to connect to the sewer system.

The future total populations to be served are highly conservative because no estimates of future industrial, institutional or commercial growth are included, and because the developments of Chesterbrook and Westgate are not incorporated in the population projections.

2. Study Area Population

Although Tables III-9, III-10 and III-11 allocate 1970 equivalent and future population by municipality and by drainage basin the Study Area does not include each municipality in its entirety. In fact, only Malvern Borough lies completely within the Study Area. Therefore, the population figures in Table

III-10 provide a correct estimate of municipal growth for the Statistical Study Area, but should not be interpreted as representing the Study Area population.

To provide the reader with an estimate of the Study Area population, the methodology for wastewater management analysis described earlier in this statement was implemented, allocating 1970 population by subdrainage basin within each municipality. Figure III-2 shows the subdrainage basins and clarifies the precise areas of each municipality included in these estimates.

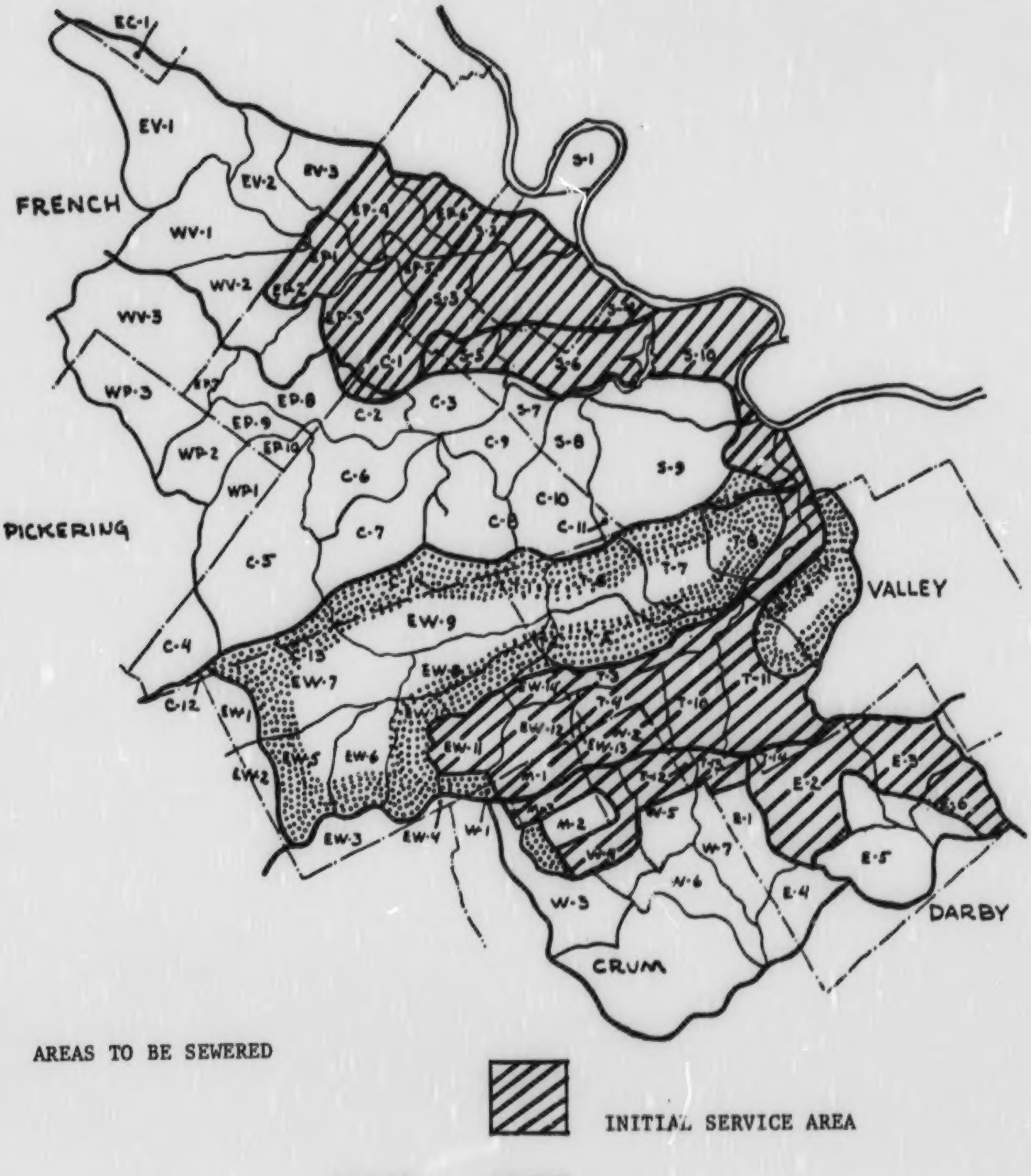
This process involved several steps, using U.S. Census data for 1970. The Census provided block by block population data for Tredyffrin, Easttown, Willistown and East Whiteland Townships and Malvern. The borders of the subdrainage basins (see Figure III-2) were conformed to the nearest block boundaries and the 1970 population of the subdrainage basins were determined on this basis.

Block population data were not available for the townships in the remainder of the Study Area. For these townships, the population was apportioned among the various subdrainage basins on the basis of amount of built-up area. The population of those subdrainage basins within the Study Area were then aggregated in the appropriate manner to be represented in Table III-12.

As was stated earlier, the accuracy of population projections declines as the area for projection becomes smaller. Should a major development occur in one portion of a township, the future distribution of population would clearly be different from the present estimate. On the other hand, the total future population of the Study Area would probably not be dramatically different.

With this in mind the percent allocation of future growth in Table III-12 should be interpreted as probable distribution of population growth with wide deviations for areas with low populations.

The future population growth was assumed to distribute in a similar manner to the present distribution except in the case of Tredyffrin. Tredyffrin is the only municipality where the majority of the population live on less than half the land, where that land is presently sewered and almost fully developed, and where the remainder of the township that is to be sewered has substantial undeveloped land. This should cause most of the new population entering the Township to locate in the Valley Basin.


EC-1
EV-1
EV-2
EV-3
FRENCH
WV-1
WV-2
WV-3
EP-1
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EP-3
EP-4
EP-5
EP-6
EP-7
EP-8
EP-9
EP-10
S-1
S-3
S-4
S-5
S-6
S-7
S-8
S-9
S-10
C-1
C-2
C-3
C-4
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C-6
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C-9
C-10
C-11
C-12
C-13
WP-1
WP-2
WP-3
PICKERING
EW-1
EW-2
EW-3
EW-4
EW-5
EW-6
EW-7
EW-8
EW-9
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T-14
VALLEY
M-1
M-2
W-1
W-3
W-4
W-5
W-6
W-7
E-1
E-2
E-3
E-4
E-5
E-6
DARBY
CRUM
AREAS TO BE SEWERED
INITIAL SERVICE AREA
+
DESIGN SERVICE AREA

FIGURE III-2

TABLE III-12

STUDY AREA POPULATION PROJECTIONS
BY MUNICIPALITY AND DRAINAGE BASIN: 1970-2000

Drainage Basin and/Municipality	% of Municipal Population Allocated 1970	Future Growth		Population 1970	1985	2000
French/Pickering						
Charlestown	89.8	89.8		1535 *	2091	2422
East Pikeland	75.0	75.0		3288	5797	8170
East Vincent	15.7	15.7		800	1007	1275
Schuylkill	73.5	73.5		4251 *	7070	9734
West Pikeland	26.8	26.8		381	637	972
West Vincent	31.7	31.7		600	742	905
			TOTAL	10,855	17,344	23,478
Valley						
Charlestown	8.8	8.8		175	205	237
East Whiteland	93.6	93.6		6778	10,581	14,171
Malvern	62.6	62.6		1617	1901	2166
Schuylkill	24.2	24.2		1399	2327	3204
Tredyffrin	24.0	75.0		5611	11,238	16,526
Willistown	15.4	15.4		1408	2467	3469
			TOTAL	16,988	28,719	39,773
Crum/Darby						
Easttown	85.9	85.9		8221	10,941	13,499
Malvern	37.4	37.4		966	1136	1294
Tredyffrin	5.0	2.0		1159	1309	1450
Willistown	61.3	61.3		5599	9815	13,802
			TOTAL	15,945	23,201	30,045
			TOTAL	43,788	69,264	93,296

* Excludes Valley Forge Army Hospital which was served by agreement with Phoenixville and is now closed.

3. Estimation of Sewage Flows

In response to public comment on the Draft EIS, EPA, Region III, performed an analysis of effluent flows independently of the municipal engineer's determination of needed design capacity. Using the regional analysis methodology discussed previously, effluent flows were estimated for 1970 based on the major sources of resident population, industrial and institutional activities and septage pumping. The unavailability of data on effluent flows from commercial activities and small industrial operations causes this flow estimate to be conservative.

The flow estimates for 1985 were based on estimates of population to be served as a percent of DVRPC projected population and on growth in industrial and institutional activity. Since no projections for industrial or institutional activity have been developed by Chester County or by DVRPC and since flows from these activities are significant, EPA conservatively estimated growth in this area to be approximately one-third over the fifteen year period from 1970 to 1985. This is less than the projected percentage for population growth and, in view of recent industrial development in the Study Area, may be highly conservative.

For the design year of 1985, then, a conservative flow estimate would be 7.03 mgd. Adding commercially generated flows and one or more major development complexes and assuming a more liberal estimate of industrial growth would cause flows to be substantially higher; accordingly, the municipal engineer's aggregate flow estimate of 7.53 mgd is considered reasonable. This independent analysis by EPA is shown in Table III-13. (See also Section VI, "Conclusions and Recommendations").

4. Population Estimate for April, 1973

The Chester County Planning Commission prepared estimates of population by municipality using building permit data issued in each municipality since the last census. This data was used to determine the number of additional housing units which in turn was translated into population by applying average known household sizes to single-family, apartment or mobile homes.

Table III-14 presents the County's estimates, indicating that the municipalities in the Statistical Study Area increased 4.9% or 4,343. According to the County, in all cases where declines in population occurred since 1970, the loss was due to declining institutional population. While the rates of population growth during this three year period were below growth rates experienced in the Statistical Study Area between 1960 and 1970, this is probably attributable to depressed conditions in the housing industry and should be corrected in the latter half of this decade.

TABLE III-13
FLOW ESTIMATES 1970, 1985
VALLEY FORGE SERVICE AREAS
(in mgd)

	Initial Service Area 1970[1]	Design Service Area 1985[1]
Population	3.04	5.59[2]
Industrial/Institutional	.6[3]	.8[4]
Other Industrial Employment (10 gal/emp./day)	.01	.01
Community Facilities	.3[5]	.5
Septage Pumpage within Study Area	.11	.11
Septage Pumpage from surrounding Area	.02	.02
Estimated Total Flow	4.08	7.03

Note: Other than inclusion by way of general population growth projections, this table does not include allowance for Chesterbrook in Tredyffrin Township (1.1 mgd), Westgate in East Whiteland (1.0 mgd) or any other identifiable pending major development.

1. See Figure III-2 showing "Initial Service Area" and "Design Service Area" boundaries and small drainage basins contained in each.

2. Based on assumption that 90% of population in low density areas within Service Areas will be included and 90 to 100% of population in dense urban areas (i.e. Malvern, Easttown) will receive sewer service.

3. See Table II-14,"Industrial and Institutional Sewage Plants - Average Flows"and Section II.C.5.b, indicating a conservative estimate in 1973 of 1.0 mgd.

4. Assumes one-third growth in industrial and institutional effluent due to population growth.

5. Includes public and non-public school, nursing home and hospital population.

TABLE III-14

POPULATION ESTIMATES FOR APRIL, 1973[1]
For Statistical Study Area

Municipality	POPULATION April, 1970	April, 1973	Difference	Growth Rate %
Chester Co.	277,746	299,449	21703	7.8
Charlestown	3,528	3,081[2]	-447	-12.7
E. Pikeland	4,384	4,568	184	4.2
Easttown	9,565	9,835	270	2.8
E. Vincent	5,084	4,804	-280	-5.5
E. Whiteland	7,242	8,384	1142	15.8
Malvern	2,583	2,898	315	12.2
Phoenixville	14,823	16,030	1207	8.1
Schuylkill	5,779	5,953[2]	174	3.0
Tredyffrin	23,404[3]	24,817	1413	6.0
W. Pikeland	1,420	1,515	95	6.7
W. Vincent	1,890	2,016	126	6.7
Willistown	9,128	9,272	144	1.6
Statistical Study Area	88,830	93,173	4,343	4.9

1. Source: Chester County Data Population, No. 7, August, 1973. Chester County Planning Commission.

2. Loss of population due to closing Valley Forge Hospital.

3. The published census figure (see Table III-1) for Tredyffrin, 23,337, was in error according to the Chester County Planning Commission and has been corrected by adding 67.

It is estimated that roughly 80% of this growth occurred in the Initial Service Area, indicating that estimated flow in 1973 was 4.43 mgd (4.08 plus .35 mgd).

E. Planning and Land Management

This section presents a critical analysis of the planning and land management in Chester County and the Study Area. As background, it examines the current national trend towards an increasing public control of land use and the changing concept of land which provide the underpinning for development of an effective planning and land management program. It discusses local planning within the Study Area and identifies key differences between local, county and regional planning. It also identifies the absence of effective interaction between local and county governmental planning programs and the failure of regional planning to impose sufficient parameters or guidelines on local development to protect public investment, to protect the environment and to enhance the quality of life.

1. Critical Analysis of Land Planning and Land Management

Today, there is a movement to increase public control of land use at all levels of government. Citizens have witnessed the degradation of their environment and the quality of life. At the same time they have discovered the existing common law remedies to be inadequate to protect property interests, to assure quality living conditions and to provide optimum use of a land base suddenly perceived as finite. Citizens have also lost faith in advisory planning boards and the professional planners advising them since such public bodies have been unable to influence private decisions that impact public rights and to reflect non-economic factors such as short and long-range environmental effects, housing, recreational needs or the aesthetic aspects of land development. As a result, demands arose for the government to expand its role from that of facilitating unrestricted private land development to that of imposing some measure of control on land use to protect the larger public interest. In the past many land use decisions were controlled by private economic interests concerned with only short-term profit. In the future land use decisions must be influenced by long-term, public concerns.

Of equal importance to the growing disenchantment with governments' inability to control land use is the change occurring in the basic concept of land ownership. Reflected throughout this nation's political, economic and social history has been the traditional concept that land is a commodity to be bought and sold, used and depleted by its owner as he or she sees fit, with a minimum of governmental involvement or guidance. Today, the concept of achieving environmental quality and improving the quality of life mandates that land can no longer be considered as a commodity. This interpretation has been supported in court decisions across the nation.

In cases where the individual's use of his land is so restricted as to constitute a "taking", adequate compensation for withholding development rights must be given. The issue of compensation for such taking is a right guaranteed by the Constitution and is subject to determination by the courts. While this issue is not dealt with here, recent court cases have held that an owner of land has no absolute right to change the essential natural character of his land so as to use it for a purpose for which it was unsuited in its natural state and that injures the rights of others.*

Therefore, land must now be viewed in the context of a non-renewable natural resource, whose initial use is in many instances irreversible and whose use can impact the environment, the economy and the social problems of a metropolitan area far beyond the limits of the individual property line or municipal or state boundaries.

2. History and Present Status of Local Land Development Controls

In the 1920's, zoning and other related land use controls were used in small city type developments largely on a lot by lot basis. Development in those days was limited by the need for sewers and by public transit extensions (the only available mode of transportation). The need to relate to a metropolitan plan was unheard of, let alone the people's right to clean air, pure water, and the concern for husbanding our land resources, or preserving the natural, scenic, historic and aesthetic values of the environment.

In the 1950's, the impact of post-war developments initiated a great debate about the role of public planning and zoning and other governmental controls in the use of public powers to restrict a land owner's "right to use his land as he sees fit". The few local plans and zoning ordinances in the suburban areas hit by development pressure, for the most part, were prepared without professional assistance and bore little resemblance to the current concepts of comprehensive planning.

During the 1960's, through the Federal planning assistance program Section 701, there was widespread adoption of planning and zoning based upon simplified forms of contemporary planning. These plans did provide local government and the public with some understanding of the planning process and related regulatory tools. By the mid-60's, public opposition to some land use controls had largely disappeared. Continuing opposition to apartments, smaller lots for single family homes, growing public concern for environmental quality and developments that contribute less in tax revenues than the cost of municipal services became the major issues of public concern. As yet, local municipal plans and zoning ordinances did not relate to larger regional plans, objectives or policies.

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* Just v. Marinette County, 56 Wis. 2d 7, 201 N.W. 2d 761, 4 ERC 1841 (1972).

In 1968, the Pennsylvania General Assembly enacted the Pennsylvania Municipalities Planning Code, Pa. Stat Anno, tit. 53, § 10101 et seq., which prescribed a new uniform planning law for municipalities that eliminated differences in several municipal codes. Among the many changes, the legal importance of the official comprehensive plan as the basis for zoning and other regulatory actions was increased and the function and minimum requirements of the comprehensive plan were defined. Local comprehensive plans were required to contain, at a minimum, a statement of the municipality's objectives, a land use plan, a circulation plan, plans for community facilities and a statement of the relationship of a municipality to the larger region. After five years of experience with the Code, there is a very apparent need for greater understanding of the relationship of municipal planning to the larger area whether it be county, a sub-region of the county or the entire Philadelphia region.

In general, within the Study Area, there has been a long-standing interest in land use planning and protection of community values. Evidence of the early establishment of land use controls by the municipalities is shown in Table III-15 which gives the date of the original establishment of zoning and of their present comprehensive land use plans. Of the 12 municipalities with portions of their areas within the Study Area, six have comprehensive plans adopted after passage of the 1968 Pennsylvania Municipal Planning Code, four are currently updating their plans and one (Malvern) is working on its first comprehensive plan.

Plate 19 presents the current composite land use plan for the Study Area. This composite plan reflects current policy at both County and local levels.

The goals and proposals taken from the land use plan for each municipality which has a plan at this time are presented below and indicate community planning attitudes in each of the eight participating municipalities. The purpose of this analysis is to show what planning objectives each municipality considers important and to characterize each municipality's motivation toward planning.

Charlestown Township

Charlestown Township has not as yet received heavy pressure for development. At present, access by highway is difficult and no major highway improvements are currently scheduled. Even though

TABLE III-15

DATES ZONING ADOPTED[1] AND DATES OF COMPREHENSIVE LAND USE PLANS[2]

MUNICIPALITY	YEAR ZONING ESTABLISHED	YEAR OF CURRENT PLAN
Charlestown	1950	1965 (in process of update)
E. Pikeland	1970	1965 (in process of update)
Easttown	1939	1972
E. Vincent	1968	1969
E. Whiteland	1953	1973
Malvern	1962	(In process of original plan)
Phoenixville	1945	1970
Schuylkill	1955	1965 (amended 1971)
Tredyffrin	1940	1970
W. Pikeland	1951	1973
W. Vincent	1956	1966 (in process of update)
Willistown	1947	1968 (in process of update)

1. Source: Chester County Planning Commission

2. Source: DVRPC.

the Pennsylvania Turnpike is along Charlestown's southern boundary, no interchanges are located in the Township. However, because the adjacent townships of Schuylkill and Tredyffrin are growing rapidly, Charlestown anticipates and is planning for similar growth pressure.

Charlestown's stated goals are ambivalent. The "retention of the quiet residential character of the community and preservation and nurturing of its historic past" are goals, as are "the establishment of a stronger tax base, the improvement of internal circulation and the provision of better community facilities". The Charlestown comprehensive plan indicates that interests in former values are predominant among township residents.

> "Charlestown now is a fine place to live, possessing a significant historic heritage and attractive landscape. Both old and new residents of Charlestown are generally well satisfied with their community and they wish to conserve its best feature. Basically, this is the reason why this plan was undertaken".

This attitude is certainly similar to that found in Easttown Township. Charlestown, however, is not now as well prepared to meet development pressures but has the opportunity of doing so in its present plan update.

East Pikeland Township

The following quote from the East Pikeland Township Comprehensive Plan seems to summarize township attitudes:

> "The residents' major complaint has been against the rising taxes and desire for better services, utilities and zoning regulations. About 50% have queried about some sort of industrial development as a means of alleviating the present high taxes".

Unlike Charlestown, East Pikeland has apparently chosen the development route in order to lower taxes, but perhaps equally important is an acceptance of their regional role. Because Pennsylvania Routes 23 and 724 pass directly through the township, the Phoenixville Spur to the Schuylkill Expressway extension connects directly to these highways and the relatively gentle topography, development potential is considerably greater than in Charlestown and other less accessible municipalities.

On the other hand, East Pikeland advocates development controls and clear separation of land uses:

> "Areas of historical importance, natural scenic beauties and open space... should be retained... The present commercial (area)... should be more defined and controlled.... Kimberton Village... should be preserved and further emphasized."

Easttown Township

Having enacted its first zoning ordinance in 1939 and having been the site of a landmark zoning case*, Easttown has a long history of land use control efforts. More recently, it completed its initial comprehensive plan supplemented by an environmental inventory to assist in these same efforts.

At the same time, Easttown recognizes its geographic location, particularly the effects of U.S. 30 passing across its northernmost corner. Here apartments (including low income housing), commerce and improved mass transit facilities are proposed.

East Whiteland Township

Perhaps more than any municipality in the Study Area, East Whiteland has committed itself to development. There certainly must be a degree of resignation in the township, characterized by a statement contained in its comprehensive plan that the township is "brutally sliced by railroads and highways" inasmuch as three rail lines, two major highways and one electric transmission line pass through the center of the township within a mile of one another.

On the other hand, such facilities provide regional responsibilities and local opportunities representing important developmental factors.

The community development objectives contained in East Whiteland's proposed comprehensive plan clearly emphasize the word "development".

Malvern Borough

In comparison with its neighbors, Malvern is a late arrival in the land use planning process. It did not enact a zoning ordinance until 1962 and is only now preparing its first comprehensive plan. Because the Borough is so small (1.2 square miles) and relatively built-up (2,583 persons in 1970), little need was felt for land use control. More recently, however, Malvern has been feeling pressure for high density residential development, perhaps due to the ready availability of commercial services or anticipation of the Main Line commuter extension to Exton through Malvern. Whatever the reason, the potential impact of multiple family housing developments on a municipality as small as Malvern has been foreseen. This, plus lesser problems of deterioration of a portion of existing housing supply, the threat to the Borough's water supply and need for modernization of its central business district have brought planning to Malvern.

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*National Land and Investment Co. v. Easttown Township Board of Adjustment, 419 Pa. 504, 215 A.2d 597(1965).

As a result of past apathy toward land use planning policy, no predominant theme can be considered to characterize Malvern as is the case in other communities. Only an adopted comprehensive plan will be able to do that.

Schuylkill Township

Schuylkill, like Charlestown and many other municipalities, is seeking the best of both worlds in its planning efforts, i.e., residential character and an increased tax base. The following are excerpts from the Schuylkill Township Comprehensive Plan:

> "The basic objectives of Schuylkill Township are... To retain its quiet residential character and likewise preserve and protect its historic past.... To encourage economic growth by expansion and the addition of new industry...."

Unlike most communities trying to achieve these or similar contradictory objectives, Schuylkill has a chance to succeed. The southwestern quadrant of the township, isolated by the Pickering Creek Reservoir, Valley Forge State Park and North Valley Hills and characterized by the sharply rolling hills of the Pickering Valley so typical of adjacent Charlestown Township, could remain relatively remote and of low density. North of Pickering Creek and east of Pennsylvania Route 23, such is not the case. Here, Route 23, the Borough of Phoenixville, the Reading and Penn Central Railroads and the potential impact of the Phoenixville Spur make this portion of the township obviously a part of the Route 23/724 development corridor.

Schuylkill Township's primary land use planning concern is and will be its ability to treat diverse development problems. Also, as Easttown Township has found in the past, even with the best possible land use control ordinances, current state-enabling legislation may be insufficient to maintain the low density development desired in the Pickering Valley.

Tredyffrin Township

Tredyffrin is by far the most populated township in Chester County, and is typical of other rapidly expanding suburban townships in counties adjacent to Philadelphia. In these communities, large-scale single family sub-divisions, shopping centers, industrial and office parks, and finally apartment complexes all developed in rapid-fire order, doubling and even tripling population in less than 10 years.

Like East Whiteland and to some extent East Pikeland, Tredyffrin recognizes the impetus for development when a community straddles a major transportation corridor, and consequently has attempted to accomodate this development. At the same time, it has enacted a broad, effective and sometimes innovative set of development controls to preserve its existing natural and man-made assets. The goals and objectives contained in the Township Comprehensive Plan are reflective of these attitudes.

A specific ordinance reflecting Tredyffrin's approach to land use planning is presented here. First, in 1963, it enacted an historic district ordinance placing development restrictions on designated buildings within specifically delineated districts as historic or architecturally significant, Tredyffrin did not feel it had such an identifiable district or districts; thus, it designated the entire township as historic and idenfified specific buildings instead. Although Charlestown, East Pikeland and Schuylkill Townships have proposed historic districts in each of their communities, none has yet passed an ordinance so that Tredyffrin remains the only municipality in the Study Area with such an ordinance.

The use of planned unit development (PUD) as a planning technique is being used in areas of Tredyffrin where development is nearly irrevocable. Tredyffrin's policy appears to reflect the view that through the use of PUD, more people can be accomodated with less injury to the environment than through piecemeal development.

Willistown Township

Willistown's record in land use control is very similar to that of Easttown - early enactment of zoning regulations, large lot residential zoning and acceptance of business activity along U.S. 30. Unlike Easttown, Willistown has not as yet turned to detailed environmental criteria for land use control although, in its statement of objectives, the Township Plan makes frequent reference to general environmental matters.

3. Status of Comprehensive Land Use Planning for Chester County

The existing land use plan for Chester County is primarily a composite of all the municipality land use plans previously discussed in the foregoing Section. No strong County Comprehensive Land Plan has yet been produced. The need for such a plan has been recognized by the County Planning Commission as the means of effectively guiding the development/non-development patterns of the municipalities within the jurisdiction of the County.

The County's role, land use policy and attitude toward large scale development is evident in the following material excerpted directly from the Planning Commission's 1967-1968 Annual Report:

a. The County's Role in Land Planning

> "The Land Use Plan is the most basic of the comprehensive planning processes because land use is related to everything else such as highway and transit, water and sewers, open space, intensity and amounts of uses and what necessary services will be provided."
>
> "Most Chester County Municipalities have now completed a first round of experience of land use planning...."

Both the Pennsylvania Municipalities Planning Code and the newly adopted Article I, Section 27 of the Pennsylvania Constitution reaffirm the previous principle that the municipalities have the primary power in zoning and land use control. "Accordingly the Chester County Planning Commission has encouraged the municipalities to adopt land use and other elements of comprehensive planning. Hopefully, each municipality will analyze its location in relation to regional needs and opportunities." (Emphasis added).

So far, the Chester County Planning Commission has not yet produced a separate County Land Use Plan. The County has recognized that the composite of the municipal plans is the actual de facto plan submitted by those governments having legal jurisdiction to enforce land use planning. The municipal plans have in part been used for development of the County plans for sewers, highways, etc. At the present time, consideration is being given to developing an interim sketch plan for the County by the Planning Commission.

b. The County's Land Use Policy

"The general land use policy that has evolved for Chester County which has been suggested by the Chester County Planning Commission, the Delaware Valley Regional Planning Commission and others is to have a well planned area of relatively higher density in the major transportation corridors and around the major existing centers plus some selected new centers.

"The principal developmental areas would be along the Route 30 Corridor where there is a major expressway, major electrified railroad, ability to supply water and sewers, level land, and a nucleus of existing settlements.

"The secondary major development areas would be along the Schuylkill River (between Route 23 and the Reading Railroad) where again there is also the possibility of water and sewers, major highways and railroads, existing settlements, and an absence of valuable farmlands.

"A third smaller development area would be the U.S. Route 1 corridor.

"The remainder of the County, including the majority of the productive farm lands, the majority of its steeper slopes, flood plains and natural resource areas would remain undeveloped or in low density.

c. Attitude Toward Large Scale Development

"One of the trends receiving special interest in governmental planning, among real estate people and among the general public is the trend to large scale planned residential development, the largest of which are sometimes called 'new towns'. The success among others to the 'new towns', Columbia and Reston in the Washington, D.C. region for example, have and will inevitably inspire similar developments on a smaller scale.

"For most people, this type of planned residential development scale offers a far better physical environment, more amenity, and meaningful open space. For the society as a whole, more and better services

> can be provided at lower cost, the wastes of urban sprawl can be reduced and the undue costs of valuable agricultural land can be minimized.
>
> "As an outer county in 'megalopolitan' eastern United States, it is virtually inevitable that Chester County will be the location of future large scale planned residential developments."

d. Coordination between Local and County/Regional Plans

> "There has been increasing criticism, growing in responsibility and magnitude in recent years, that vesting of land use control powers in a large number of local governments may be seriously interfering with regional and national needs. The recent National Commission on Urban Problems, among many other studies, examined the pros and cons of the existing situation in detail.
>
> "However, the Chester County Planning Commission does recognize that many of the suggestions by the Delaware Valley Regional Planning Commission and others for better planned and better designed higher density developments in proper locations have merit. It is hoped that in subsequent phases of the planning process more attention can be given to a reevaluation. In many cases the initial municipal zoning ordinances did properly emphasize large lot zoning as a means of temporarily holding back development until such time as the more desirable future pattern becomes apparent. It would be appropriate to reevaluate plans in some municipalities, in the light of the new regional requirements, and the concept of the corridor pattern of county development. Further work in land use is highest among the priorities for continuing planning." (Emphasis added)

In September, 1972, the Chester County Planning Commission updated this statement in a publication entitled "Status of Planning":

> "The major land use planning issue is how to preserve both local control and meet regional needs .

> "The Pennsylvania Constitutional Amendments of 1968, the Municipal Home Rule Act of 1972, and the 'Pennsylvania Municipalities Planning Code' of 1968 all more than ever firmly vested power over zoning and other land use controls in the municipalities. During the same period 1968 to 1972, the decisions of the Pennsylvania Courts, the requirements of the Federal and State governments, and the general needs of the society all brought powerful pressures for a more regional approach to land use controls.
>
> "At the beginning of 1972 federal requirements for grants were beginning to be strengthened to require conformance of local zoning to the regional land use plan. In Pennsylvania, the Secretary of Community Affairs recently required that open space and industrial development grants be related to regional housing needs.
>
> "In the 'Girsh'* and 'Kit Mar'**cases and several others the Courts are increasingly moving toward the position that essential regional needs must be provided. To the extent that the cumulative effect of local zoning prevents the building of needed homes and facilities, much of the existing zoning is in jeopardy. The Courts have suggested that more regional planning may be the right approach to this major dilemma."

These landmark zoning cases in Pennsylvania (Girsh, Kit Mar, et al.) involved sites in the metropolitan Philadelphia area. The basic finding in each case was that local communities have an obligation to meet demands for residential development where a bona fide demand exists.

> "There is a Land Use Plan for Nearly Every Municipality in Chester County.
>
> "To what extent does the composite of the municipal land use plans meet the tests of sound county and regional planning. The initial Chester County housing studies addressed this question in the developmental controls report. To a considerable extent the composite of the local zoning fits together better

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* Girsh Appeal, 437 Pa. 237, 263 A. 2d 395 (1970).

** Appeal of Kit-Mar Builders, Inc. (Concord Township Appeal), 439 Pa. 466, 268 A.2d 765 (1970).

than is indicated by the general tone of the national criticism. For example, the areas with higher densities are generally those that are adjacent to existing centers of urbanization, have the ability to extend water and sewer lines or are along the major transportation corridors existing and proposed for the County. Conflicts at municipal boundaries were relatively few.

"The chief needs were to provide for more areas where apartments, townhouses, and planned developments can be built. To a considerable extent these needs are being addressed in current plan revisions and in day-to-day zoning revisions. However, the shortage of land available for higher density housing has created an artificial shortage, and a monopoly type value and this has increased inflated housing costs.

"It is also contemplated that the proposed Chester County Planning Commission studies will increasingly address this issue. The initial housing study pointed out that if the planned residential developments now proposed are built, about 60% of the projected population growth of the 1970's could be housed in a small fraction of the County land area. Most of the proposed planned developments are well located in relationship to basic accessibility to jobs, transportation and natural ecology.

F. Federal and State Environmental Controls

1. Federal

The Clean Air Act Amendments of 1970 (CAA) and the Federal Water Pollution Control Act Amendments of 1972 (FWPCA) give EPA a certain amount of indirect control over development. The manner in which EPA implements the provisions of these acts can affect both the rate and extent of development.

a. Clean Air Act

Some of the major provisions of the CAA are:

1. EPA, assisted by the states, will designate air quality control regions. (AQCR's).

2. EPA will develop air quality criteria for the major pollutants and will provide the states and appropriate air pollution control agencies with information on control technology for each of the pollutants.

3. EPA will set primary and secondary national ambient air quality standards for each major air pollutant. A standard will establish the maximum permissible level for a given pollutant. Primary standards will be strict enough to protect the public health; secondary standards will be strict enough to protect the public welfare. Both sets of standards will apply to all AQCR's.

4. Within nine months of EPA's issuance of primary and secondary standards for a pollutant, each state will formulate an implementation plan to meet, maintain and enforce those standards in each AQCR.

5. EPA will also set "standards of performance" that will constitute direct emission limitations for all major pollutants from specified types of sources.

The provisions of the CAA were duly fulfilled. However, in May, 1972 the U.S. District Court for the District of Columbia, in response to a suit filed by the Sierra Club and other groups, issued a preliminary injunction requiring the EPA Administrator to disapprove any portion of a state implementation plan which failed to prevent significant deterioration of existing air quality. EPA appealed the judgment and the matter was finally brought to the attention of the U.S. Supreme Court. The Court was evenly divided on the matter, in effect upholding the original judgment of the lower court*. Although the courts did not define significant deterioration, they did agree that wherever the air is cleaner than required by the national standard, it should not be allowed to decline in quality to the standard. As stated in 38 Fed. Reg. 18986 (July 16, 1973):

> "In EPA's view, there has been no definitive judicial resolution of the issue whether the Clean Air Act requires prevention of significant deterioration of air quality. (Nevertheless, the EPA Administrator has proposed alternative regulations that would) establish a mechanism for preventing significant deterioration pursuant to the preliminary injunction issued by the District Court. (The bases for preventing significant deterioration are the desire to protect aesthetic, scenic and recreational values and the concern that some air pollutants may have adverse effects that have not been documented.) The problem of preventing significant deterioration can be somewhat simplistically stated as that of reducing emissions to the lowest practicable level, and then distributing those residual emissions in a manner in which they do the least harm."

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*No opinion was issued in the evenly divided Supreme Court decision. The upheld D.C. Circuit Court opinion is found at 4 ERC 1815 (1972). The original Federal District Court decision is found at 344 F. Supp. 253, 4 ERC 1205 (1972).

As of this writing, the EPA Administrator has written each Governor advising of the soon to be published re-proposed regulations to prevent significant deterioration of air quality. As proposed, states will classify each "clean area" into one of 3 categories": limited growth (Class I), moderate emissions growth (Class II) and intensive (up to national standard) emissions growth (Class III).

EPA has also promulgated regulations for the review of new or modified indirect sources of air pollution (39 Fed. Reg. 25292 (July 9, 1974); see also 39 Fed. Reg. 7270 (February 25, 1974)). An indirect source is a facility, building, structure or installation which causes or which may cause mobile source activity resulting in emissions of a pollutant for which a national standard has been established. Indirect sources include highways, parking facilities, airports, industrial facilities, retail and commercial establishments, and residential complexes. EPA's indirect source regulations, which become effective January 1, 1975, require that the potential effects of a facility on air quality be evaluated before construction of that facility begins.

Additionally, EPA administers (1) transportation control plans (TCP's) designed to assist in the attainment and maintenance of National Ambient Air Quality Standards for carbon monoxide and photochemical oxidants, (2) new source performance standards to insure that new stationary pollution sources do not exceed specified emission levels and (3) Air Quality Maintenance Areas (AQMA) to prevent violations of any National Ambient Air Quality Standards within the next 10 years.

b. Federal Water Pollution Control Act

The provisions of the FWPCA constitute EPA's second major source of indirect control over land use and development patterns. Titles II and IV have the most direct bearing on EPA's authority in this area.

Title II deals with Federal grants for the construction of wastewater treatment works. It directs EPA to require and to assist in the development and implementation of waste treatment management plans and practices that provide for the application of the best practicable waste treatment technology before any discharge is made into receiving waters. Title II gives the EPA Administrator the authority to make grants to any state, municipality or intermunicipal or interstate agency for the construction of publicly-owned treatment works which must also be consistent with the National Environmental Policy Act (NEPA).

The EPA's interim regulations entitled "Preparation of Environmental Impact Statements", 40 C.F.R. Part 6* (1973) requires EPA to consider whether the proposed treatment works will induce or encourage significant changes in industrial, commercial or residential concentrations or distributions. "Factors that must be considered in determining if induced changes are significant include but are not limited to: the land area subject to increased development as a result of the project; the relative increase in population which the project may induce; the potential for overloading sewage facilities; the extent to which land-owners may benefit from the areas subject to increased development; and the nature of land use regulations in the affected area and their potential effects on the development." The interim regulation also requires that EPA consider whether "...the project will include or induce development which will have a significant adverse effect upon local ambient air quality, local ambient noise levels, surface or groundwater quality, fish, wildlife, their natural habitats, or other elements."

Title IV created the National Pollutant Discharge Elimination System (NPDES) to replace the permit program authorized by the 1899 Refuse Act. Title IV also transferred responsibility for the permit program from the Corps of Engineers to EPA. Under the new system, EPA is required to establish national effluent limitations and performance standards for sources of water pollution, including sewage treatment plants. Publicly-owned sewage treatment plants must provide a minimum of secondary treatment by July 1, 1977 and best practicable technology by July 1, 1983. NPDES makes it illegal for point sources, including sewage treatment plants, to discharge any pollutant into the Nations's waters without a permit.

To insure lasting abatement of pollution from municipal waste treatment works, special conditions related to planning for growth (defined as increases in waste load generation) may be included in permits issued to municipal facilities in high-pollution and high-growth areas. The primary objective of these conditions is to link two usually autonomous "decision streams": (1) sewage and treatment decisions under the powers and authorities of special purpose sanitary districts, and (2) land use and zoning decisions under the powers and authorities of general purpose local governments. The inclusion of special conditions in a permit also sets the stage for possible imposition of sewer connection bans, under the powers of FWPCA Section 402(h), as the principal enforcement mechanism against municipal permit violators.

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*New NEPA regulations were proposed at 39 Fed. Reg. 26 54 (July 17, 1974). Until such regulations are finally promulgated, the above-cited interim regulations remain in effect.

EPA's Office of Air and Water Programs has prepared a paper entitled "Task Force on Land-Use Implications of Municipal Permits (1973)", which details the circumstances under which such growth-related special conditions should be added to a municipal permit, as follows:

1. Facilities that discharge to water quality limited segments,
2. Facilities located in "high-growth" SMSA's (i.e., 3% annual increment), and
3. Facilities located in an area covered under a transportation control plan promulgated pursuant to the Clean Air Act.

The Study Area meets the first and third of these criteria.

2. Commonwealth of Pennsylvania

Article I, Section 27 of the Constitution of Pennsylvania, adopted May 18, 1971, provides as follows:

> "The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people."

In a recent case*, the Environmental Hearing Board held that "even if Article I, Section 27 were not to be regarded as self-executing, (Sections 4 and 5 of) the Clean Streams Law of June 22, 1937 as amended together with (Section 5 of) the Sewage Facilities Act of January 24, 1966, as amended, "may be regarded as legislative implementation of Article I, §27 of the Constitution...."

Although the Board's comments in the Fox case are relevent only to the case under discussion, certain comments of the Board have more general application, pertain to the Study Area and may be summarized as follows:

- The Board saw that DER's function was not to act as a land use planning agency, but to "assure that the land use planning was done and done adequately." The Board viewed this responsibility of DER as not inconsistent with the delegation of land use planning functions to municipalities under the Municipalities Planning Code. Under this code, the municipality or cooperating municipalities perform comprehensive planning. DER then has the legislative and constitutional mandate to insure that such planning is done adequately before issuing permits under the Clean Streams Law or the Sewage Facilities Act.

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*Mrs. Cyril Fox and the Natural Lands Trust, Inc. v. DER (May 16, 1974).

3. Other Environmental Controls

a. Open Space Preservation under Act 515

Pennsylvania's Act 515 enables certain counties, including Chester County, to covenant with land owners for the preservation of land in farm, forest, water supply or open space uses. "Farm land" is defined as 50 or more acres used for raising livestock or for growing crops; "forest land" means a minimum of 25 acres used for growing timber crops and "water supply land" is defined to include any land used for the protection of watersheds and water supplies, "including but not limited to land used for the prevention of floods and soil erosion, for the protection of water quality, and for replenishing surface and ground water supplies". The Act further includes "open space land", the use of which does not exceed an intensity of three percent site coverage, including structures, roads and paved areas.

The Act specifies planning requirements and covenant procedures. Once the land areas have been designated as farm, forest, water supply or open space land in a plan adopted following a public hearing by the Planning Commission of the municipality, county or region in which the land is located, the county is authorized to enter into covenants with owners of the land so designated who "may voluntarily covenant for himself and his successors and assigns in right, title and interest that the land will remain in open space as designated on the plan for a period of five years." In return the county shall covenant that the real property tax assessment, for a period of five years, will reflect the fair market value of the land as restricted by the covenant.

The Act further provides for the renewal and termination of the covenant and payment of back taxes (the difference between the real property taxes paid and the taxes which would have been payable absent the covenant), plus compound interest at the rate of 5% per year from the date of entering the covenant if the covenant is violated.

Act 515 was signed into law in 1966. Subsequently, the Constitution of Pennsylvania was amended by the legislators and the voters in May, 1973 to legalize different real estate tax rates. This amendment has put real meaning into Act 515 and offers a new tool to preserve the quality of the environment and protect the watersheds and water supplies within the Study Area in areas which would not be sewered and in neighboring municipalities upstream in Pickering and French Creek Drainage Basins.

b. Federal Flood Insurance Program Participation

After March 1, 1974, property owners in communities where national flood insurance is being sold must purchase such insurance in order to be eligible for any new or additional Federal or federally-related financial assistance for buildings located or to be located in areas identified by HUD as having special flood hazards. Three participating municipalities, East Whiteland, Malvern and Tredyffrin, currently fit under this provision of the flood insurance program; three others - East Pikeland, Easttown and Willistown - are in the process of becoming participants.

In addition, the municipalities of Charlestown and Schuylkill have been identified by the Pennsylvania Department of Community Affairs or formally designated by the Federal Department of Housing and Urban Development (HUD) as "flood prone" as specified in Section 201(a) of the Flood Disaster Protection Act of 1973. Once a municipality is formally designated by HUD as flood prone, then, unless that designation is successfully rebutted, the designated municipality has until July 1, 1975, to participate in the flood insurance program. After July 1, 1975, Federal assistance is not authorized for acquisition or construction of a project in an area having special flood hazards located in a flood prone municipality which is not participating in the flood insurance program.

By participating in the flood insurance program, the municipality not only assures land owners of flood insurance availability, but also makes available a practical flood plain management program funded by the Federal government. Adoption of the flood plain management program reduces the liklihood of flood loss and enhances environmental protection, and has accordingly been required as a condition to the grant by EPA. See Section VI, "Conclusions and Recommendations" and Appendix A, par. 1.

c. Preservation of Areas Surrounding Natural, Scenic and Historic Areas

For a discussion of pending Pennsylvania House Bill No. 2134 dealing with this subject, and its possible impact in the Study Area, see the last two paragraphs in Section V.C.7, "Impacts on Archaeological and Historical Resources".

G. Current Protection of Environmentally Sensitive Areas

1. General

Environmentally sensitive areas represent those fragile geographic areas whose natural processes, when disturbed, incur direct and/or indirect economic, social and environmental costs. These areas consist of surface waters, marshes, and wetlands, flood plains and impounding areas, aquifer recharge areas, steeply sloping land, forests and woodlands, prime agricultural lands, habitats of rare and endangered species, recreation areas, sensitive geologic conditions, and archaeological and historical sites.

The information contained in Section II.A, "Natural Environmental Setting", was used to generate the environmentally sensitive areas. Plate 16 presents a composite of these fragile areas. Plate A, "Natural Features", presents the corrected slope areas, the subdrainage ridge lines, and the soils requiring sewers and soils suitable for low density on-lot sewage disposal. These latter are the key environmental constraints on future development. There are no significant areas of marshland within the Study Area. The major historical or archaeological lands in the initial project area for the most part are in Valley Forge State Park. The Park has and continues to pursue possible expansion of Park lands. Controls in the form of blasting restrictions in the Park and excavation restrictions in areas where possible archaeological finds may exist, have been instituted to protect this area.

Existing surface waters and impounding areas should not be depleted; they should be retained to at least 100% of that available at present.

2. Agricultural Land

The "Open Space Inventory" compiled by the Chester County Planning Commission outlines areas that should be held in agricultural reserve for the future. As indicated previously, although there are very limited amounts of Class I agricultural land available within the Study Area, there are substantial Class II and Class III areas. The total number of acres being farmed in Chester County is difficult to specify due to lack of reliable data (see Philadelphia Bulletin editorial, "Arithmetic Must Be Right", July 31, 1974, p. 10.) Estimates, however, place the total farming acreage between 100,000 and 145,000 acres for the entire County. Considering the availability of these lands in other parts of Chester County, the prime agricultural lands in the Study Area represent just a small percentage of the agricultural economy of the

County. While it would seem likely that developmental pressures would result in the eventual loss of portions of the agricultural land to the developer, it is recommended that retention of the Class II and III land areas be sought, if not for continued agricultural use, for purposes of open space, wildlife habitat, aquifer recharge and natural aesthetic beauty. Pennsylvania's Act 515 described in the foregoing sub-section provides one economic incentive to make this approach feasible.

3. Steep Slopes

In addressing the question of the retention of steeply sloping land, the "Open Space Inventory" recommends that all lands with slopes over 15% be restricted from urban use and, if developed at all, should be limited to large-lot hillside housing. In addition, the Chester County Planning Commission recommends that all alluvial floodplains as depicted on the Environmentally Sensitive Areas Map, be restricted in terms of development as a minimum toward flood plain preservation. Forests and woodlands should also be retained on all steeply sloping land and wet soils. Whenever possible, the preservation of tree stands should be incorporated into development plans; this should be guided by subdivision and zoning ordinances and again encouraged by the provisions of Act 515.

4. Aquifer Recharge

Retention of aquifer recharge areas depends ultimately on the types of land uses developed in the Study Area. Conservation measures utilized in concert with development to retain run-off and the amount of withdrawal of water from aquifers, particularly Chester Valley, should be adopted. As indicated in Section II.B.6, "Hydrology", many homes are dependent upon well water for water supply.

Considering the geological conditions present in the Chester Valley (Section II.B.3, "Geology"), development of high rise residential or any similar concentrated commercial or industrial development is not recommended unless foundation conditions are fully investigated. Unless foundation conditions can be proven to be adequate, only single family dwellings should be permitted. In light of the extreme sensitivity of the aquifer recharge area and the limestone strata, quantitative goals for retention of open space should be set and precise standards for attaining recharge established. Within the limestone formation, existing and future development should be serviced by public sewers to prevent further pollution to the major source of groundwater in the Study Area. The Chester County Planning Commission has indicated that the planned residential pattern of development may offer the best opportunities for aquifer recharge area conservation.

5. Storm Water Management

A central problem in protecting environmentally sensitive areas is proper and adequate on-site storm water management. The purpose of such water management is to reduce the impact of increased storm water run-off, presently associated with construction of impervious surfaces and drainage systems designed to concentrate and accelerate delivery of the increased run-off to points of discharge.

As noted in Section II.B.6, "Hydrology", continued development due to increases in impervious areas leads to flooding conditions. In the Valley Creek Watershed according to DER, increases in impervious areas from 2 to 12% of the area could produce severe flooding of Washington's Headquarters in Valley Forge Park when both the Valley Creek and the Schuylkill are at flood stages. On-site storm water management is directed at holding storm water on-site after development and recharging groundwaters and releasing the remaining storm water slowly to avoid increased flooding and the resulting loss of damage to property.

The Chester County Soil Conservation District has developed on-site storm water management methods which are intended to restrict peak flow of storm run-off from land after development. These methods are calculated on the basis of a 100 year storm and designed to insure approximately the same run-off as existed prior to development. The methods developed by the Conservation District are shown in Table III-16. Effective application of the criteria shown could reduce increased flooding in the Study Area.

At present these on-site water management methods are being employed by developers and builders to absolve them from future blame for increased flooding and damages to property downstream. In so doing these plans for storm water management when implemented are returning as much of this water as possible back into the ground, providing continuing progress in groundwater recharge techniques. Elected municipal officials are beginning to require that subdivision plans and commercial and industrial developments include storm water management designs as one of the review areas in the proposed projects submitted to each municipality within the Study Area. Incorporation of these on-site water management methods into each subdivision control ordinance to subject each plan submitted to these requirements would reduce future flood hazards greatly in the Study Area. Among other things it could reduce the present threat of flooding Washington's Headquarters in Valley Forge.

TABLE III-16

ON-SITE WATER MANAGEMENT METHODS

No.	Description	Probable Applicability	Probable Maintenance Responsibility
1.	Sub-surface (pipes, structures, etc.) cisterns	Public or private streets, single family, multi-family, commercial	Dept. of Public Works, Homeowners Assoc. or owner
2.	Roof storage	Industrial, commercial, multi-family, institutional	Owner
3.	Parking lot storage (ponding, inlets and sub-pavement storage, etc.)	Industrial, Commercial multi-Family, institutional	Owner
4.	Retention areas-on-site possible dual-purpose with recreational facilities (such as ball fields, tennis courts, etc.) designed to hold water for a short period during & after storms.	Single family, multi-family, P.R.D. & clustered, R&D facility, institutional, etc.	Owner, Homeowners Assoc. (municipal if in public park system) Dept. of Public Works if in dedicated site or easement.
5.	Permanent pool, on-site ponds or lakes--primarily for esthetic, recreational or other purposes but with parks, etc. built-in detention & storage.	Single, multi-family, R&D facility, institutional, P.R.D. & clustered, etc.	Owner or Homeowners Assoc. (municipal if in public park system) Highway Dept.
6.	Seepage pits- used only on appropriate soils where these pits (with associated methods) will effectively control the 100 year peak run-off storm.	Single, multi-family, P.R.D. and clustered, commercial industrial, highway berms and interchanges.	Owner, Homeowners Assoc. Highway Dept.
7.	Roof top storage--to be used where buildings can be designed to carry water and/or snow load.	Commercial, industrial, multi-family, etc.	Owner
8.	Evaporation or seepage terraces (where soils & slopes permit).	Individual lots, small watersheds	Owner
9.	Porous pavement	Individual lots, parking lots--shopping centers, highways, etc.	Owner, Homeowners Assoc., Highway Dept.

Source: Chester County Soil Conservation District
West Chester, Pa.

6. Undeveloped Land

As indicated above the natural features of the Study Area shown in Plate A are the key and controlling environmental constraints on future development. Plate B presents the land still to be developed within the Study Area. While already developed areas are subject to private and public redevelopment, the remaining unbuilt land presents the central challenge in planning for the future of the Study Area in waste water management. Proposed subdivisions reviewed by the Chester County Planning Commission have been plotted on this plate. These proposals represent one possible future; a continuation of scattered suburban development represents the other.

Plate C presents the suitability of the land available for development. In Tables III-17 and III-18, EPA's analysis shows the summary of measurements of each key environmentally sensitive category for each minor drainage basin in each municipality and major watershed within the Study Area. While the aggregation of these parameters by municipality shows the relative importance of each, the comparison by watershed in Table III-18 is more significant.

- Pickering Creek Watershed is the largest but ranks as the least built up. Moreover, it has the largest percent of soils suitable for low density development. It also has the largest percent of land in slopes exceeding 15%.

- Valley Creek Watershed is the second largest but in numerical terms has the most built-up land. Since built-up land includes low density residential areas and does not distinguish high density development, this category can be misleading. Valley as well as Little Valley Watersheds rank the lowest in land with soils suitable for low density development. Next to Pickering Creek these two valley watersheds are the highest in the percent of land in steep slopes.

- Crum and Darby are the most built-up watersheds having large areas committed to low density residential development. Crum has the least percentage of its land in flood plains and steep slope areas, but blessed with substantial flood plains.

TABLE III-17

ENVIRONMENTALLY SENSITIVE AREAS BY MUNICIPALITY WITHIN STUDY AREA[1.]
(in acres)

Municipality	Total Area Munici-pality[2]	Total Area Study Area	Flood Plains	Slope Greater Than 15%	Soils Requiring Sewers[3]	Soils Suitable For Low Density Development[3]	Built-up
Charlestown	8,019.2	7,459.4	363.8	2127.0	1262.8	2847.9	857.9
Tredyffrin	12,652.8	6,804.3	364.5	981.6	2079.8	109.3	3269.3
E. Coventry	6,995.2	226.3	0	22.9	155.1	41.3	6.9
E. Pikeland	5,644.8	4,304.8	373.5	476.2	1242.0	663.0	1,550.1
E. Whiteland	6,931.2	6,027.1	236.0	635.9	2489.0	101.3	2,565.0
E. Vincent	8,793.6	2,874.2	133.1	174.5	1969.7	151.5	445.4
Easttown	5,196.8	4,052.9	206.2	174.8	298.5	1014.8	2358.6
Malvern	736.0	736.0	0	51.1	68.5	109.4	507.0
Schuylkill	6,041.6	4,565.4	504.5	892.1	1640.0	786.3	2218.5
W. Vincent	11,161.6	2,569.1	50.5	431.6	652.0	1,283.6	151.5
W. Pikeland	6,323.2	1,838.4	114.8	381.1	359.9	831.0	151.5
Willistown	11,769.6	4,120.7	102.8	199.3	420.6	595.9	2801.7
	90,265.6	45,578.6	2,449.7	6,548.1	12,638.9	8,536.3	16,881.4

1. Source: EPA, Region III. Special Analysis.
2. Source: Approximate Area and Population Density in Chester County 1970, p. 48, Status of Planning.
3. See Section II.B.5.

TABLE III-18

ENVIRONMENTALLY SENSITIVE AREAS BY DRAINAGE BASIN WITHIN STUDY AREA[1.]
(in acres and percent)

Drainage Basin	Flood Plains	Slope Greater Than 15%	Soils Requiring Sewers[2]	Soils Suitable For Low Density Development[2]	Built-up	Total
French Creek	385.4	752.5	3444.6	1076.8	2635.1	8,294.4
%	4.6	9.1	41.5	12.8	31.8	100.0
Pickering Creek	070.5	3279.9	3196.5	5145.7	2449.4	15,140.0
%	7.1	21.6	21.1	34.0	16.2	100.0
Valley Creek	414.8	1620.0	3714.3	523.1	3484.4	9,757.2
%	4.2	16.6	38.0	5.4	35.7	100.0
Little Valley Creek	185.5	520.9	1045.7	116.0	2534.4	4,404.4
%	4.2	11.8	23.7	2.6	57.5	100.0
Crum Creek	102.9	83.0	336.1	471.8	2895.4	3,889.2
%	2.6	2.1	8.6	12.1	74.4	100.0
Darby Creek	180.2	126.5	197.2	773.6	1892.5	3,169.9
%	5.7	4.0	6.2	24.4	60.0	100.0

1. Source: EPA, Region III, Special Analysis, Plate C

2. See Section II, B. 5

- French Creek Watershed in the Study Area is already heavily committed to development ranking second in percentage of the land built-up. Perhaps most important, it has the largest percentage of land with soils requiring sewers.

These significantly different natural features impose constraints on the future comprehensive planning and land management process to be employed in each municipality to insure environmental quality for its present and future residents.

The degree to which the seven municipalities with comprehensive planning programs within the Study Area recognized environmentally sensitive areas in preparation of their land use plans varies.

7. Review of Existing Protective Measures

The surface waters in the municipalities are mainly contained in distinct stream channels, which have been delineated in most plans. The floodplain areas have been outlined in two municipalities, located (but not outlined) in three and not inventoried in two others. All the municipalities have outlined on maps the areas of steeply sloping topography and shown concern for the condition of their aquifers by discussing relationship to the underlying geology, soil characteristics, and quantity and quality of existing groundwater. East Whiteland and Willistown Townships have outlined their agricultural land; whereas the other municipalities, except for Easttown Township, have discussed the suitability of the land for agriculture in relationship to the soil types available within their townships. Easttown Township is residential and agricultural use is not of significant importance. All seven municipalities have inventoried public parks, historical areas, etc., and they are shown on the existing land use maps. Finally, four of the seven municipalities have outlined their forest and woodlands in a manner that can be measured.

Appendix 4A contains a municipality-by-municipality breakdown of the information available and their existing controls. It is evident from the preceding tables and the following analysis that some of the municipalities have more adequate environmental controls than others. Yet a need still remains for the municipalities to adopt comprehensive flood plain management and erosion and sedimentation control ordinances as well as to review their past experiences with on-lot disposal systems to determine if greater restrictions should be enacted or changes in density should be sought. See Appendix 4A and Section VI, "Conclusions and Recommendations."

IV. ALTERNATIVES

Part I - Evaluation of Hardware Alternatives for Specific Subparts of a Wastewater Treatment Facility.

A. Treatment

Current Federal requirements dictate levels of secondary treatment for wastewater treatment as defined by EPA. DER has, however, established water quality standards for the Schuylkill River requiring advanced treatment. The following treatment methods were investigated and evaluated as alternatives to the recommended method.

1. Trickling Filter

Trickling filters were one of the earliest forms of biological treatment and are generally capable of removing 75 to 90% of BOD and suspended solids. A typical trickling filter plant would be comprised of a primary treatment process followed by a biological filtration step, a secondary sedimentation process, disinfection and disposal of the effluent.

A trickling filter is normally a circular bed of coarse, rough, hard impervious material over which sewage effluent is sprayed or otherwise distributed. A biological slime which grows on the filter packing is responsible for the biological reactions. The sewage then flows downward through the filter in contact with the air. The filter, usually 3-12 feet deep, is provided with an under drainage system to remove the filter effluent. The main function of this method of treatment is to remove unstable, organic, pollutional materials in the form of dissolved and finely divided organic solids and to oxidize these solids biologically to form more stable materials.

Several variations of the trickling filter process could be considered in this discussion, including standard-rate filters, high-rate filters and Dow Chemical Corporation's proprietary surfpac system.

Standard-rate filters were very popular many years ago but have been superseded by technological advances which have made them obsolete. These facilities are rarely seen today and are usually replaced with more refined equipment when this becomes necessary. Also, standard-rate filters require about ten times as much area as high-rate trickling filters. For these basic reasons, standard-rate trickling filters were not considered.

The Dow Surfpac system utilizes the concept of high-rate filtration over plastic media with greater filter depths than found in standard or high-rate filters. The Surfpac system is capable of providing secondary treatment, defined as 90% reduction of 5-day biochemical oxygen demand (BOD_5), up to 20 mgd. Over 20 mgd, the

Surfpac system serves best as a roughing filter ahead of the actual treatment processes. Although the technology utilized in the Surfpac system has been available for several years, the capability for nitrification (one of the treatment requirements for the Plant) did not become available until 1973. Since nitrification was a requirement over two years ago, systems similar to Surfpac could not be considered.

High-rate filter systems have an anticipated BOD reduction of 85 to 90%. Single-state filtration generally cannot provide any nitrification, and two-stage filters may provide some nitrification. With an assumed depth of five feet, a high-rate filter system requires 44,500 square feet of surface area plus an intermediate clarifier in addition to primary and final clarifiers.

Shock loads are more easily absorbed in trickling filters, i.e., they have the ability to cope with immediate or rapidly occurring changes in the chemical or physical environment of the biolcgical population.

The essential features of a trickling filter process are: (1) surface area must be provided for biological growth and the surface area/volume ratio must be large; (2) free oxygen must be available so that aerobic conditions exist; and (3) waste must be amenable to biological treatment (e.g., industrial wastes may not be).

In conclusion, the advantages and disadvantages of a trickling filter system are:

Advantages:

1. High nitrification in certain variations of the trickling filter process.

2. Dependability to give a good effluent under wide variations in influent quality.

3. Relatively low operating and maintenance cost.

4. Ability to function under extreme weather conditions..

Disadvantages:

1. High head loss through the filter.

2. Odor and fly nuisance (more so in low rate filters).

3. Large surface areas required.

4. High construction costs.

2. Oxidation Ponds/Waste Stabilization Lagoons

Oxidation ponds and waste stabilization lagoons are biological treatment processes acceptable for use in Pennsylvania. Single ponds are considered capable of removing 75% of BOD_5 at a maximum allowable loading of 0.5 pound of BOD_5 per day per 1,000 square feet of surface area. To achieve conventional secondary treatment, at least two ponds in a series must be provided. The second-stage ponds are limited to the same maximum BOD_5 loadings as the first-stage ponds. Considering the use of primary clarifiers ahead of the ponds, it is estimated that at least 620 acres would be required for the ponds only. Assuming a value of $4,000 per acre, acquisition costs would increase by approximately $2,500,000.

Nutrient removal is not a specific function of these two processes although some phosphorus removal and nitrification would probably occur. A waste stabilization lagoon system would probably require additional major facilities to accomplish both phosphorus removal and nitrification. Oxidation ponds could probably provide nitrification if aeration facilities are sufficiently large to accomplish this; however, separate facilities for phosphorus removal would also be needed.

3. Pure Oxygen Processes

Pure oxygen processes are relatively new operations in the treatment of sewage. Several of these processes do exist today, one being the UNOX system, a proprietary process of Union Carbide and another being the OASES system manufactured by Air Products and Chemicals Inc.

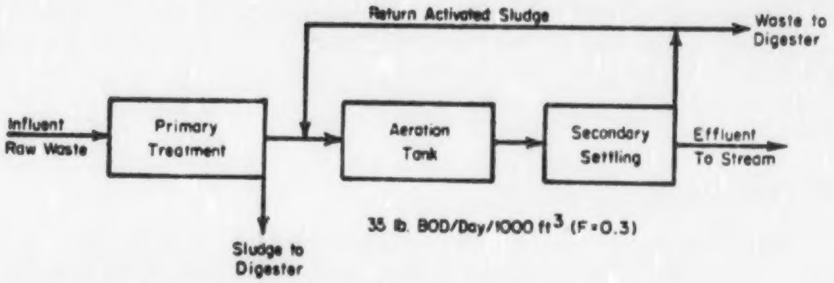
The first operational UNOX system went on line to treat industrial waste for Lederle Laboratories, Division of American Cyanamid, at Pearl River, New York in January, 1972. The first municipal plant (20 mgd) utilizing the UNOX process was converted from conventional activated sludge at Newtown Creek (Brooklyn), New York in May, 1972; the first municipal plant built specifically for UNOX was at Speedway, Indiana in June, 1972.

Due to their unavailability at the time the Plant was designed, these systems have not been evaluated in great detail at this time as an alternative method of treatment to the recommended system. However, should the pilot projects prove successful and it becomes desirable at some future time to utilize a pure oxygen process, the proposed facilities could be adapted to add this process with only minor structural conversion. A pure oxygen system could potentially be utilized to allow a plant's capacity to increase or permit denitrification.

4. Activated Sludge Processes

The activated sludge process of wastewater purification is one of the most common processes for the secondary treatment of wastes. The process consists of mixing activated sludge, recirculated from a final settling tank, with incoming raw or primary sewage to form a mixed liquor, which is subsequently aerated and from which activated sludge is later settled. As normally designed, the activated sludge process is capable of better than 90% removal of efficiences of BOD and SS.

A flow diagram of a conventional activated sludge plant is shown in Figure IV-1.


Return Activated Sludge
Waste to Digester
Influent Raw Waste
Primary Treatment
Aeration Tank
Secondary Settling
Effluent To Stream
Sludge to Digester
35 lb. BOD/Day/1000 ft^3 (F=0.3)

Flow diagram of a conventional activated sludge plant. *F* refers to sludge loading ratio.

FIGURE IV-1

In the process, primary treated sewage is mixed with a portion of return activated sludge and aerated for 4-6 hours. The process can be said to consist of the following steps:

1. Mixing of the activated sludge with the sewage to be treated.

2. Aeration and agitation of this mixed liquor for the required length of time.

3. Separation of the activated sludge from the effluent and the subsequent return of a portion of the settled sludge to be mixed with the incoming sewage.

The differences between the various processes are basically attempts to reduce tankage volume or air requirements and thus reduce initial capital expenses or annual operating costs.

The basic design parameters for all activated sludge processes do not account for nutrient removal. As nitrification is a requirement for the Plant, the various processes had to be evaluated with this consideration.

Contact Stabilization - Raw wastewater is aerated with a high concentration of activated sludge for a short period, usually less than 60 minutes, to obtain BOD removal by absorption. The solids are subsequently removed by sedimentation and transferred to a stabilization tank where aeration is continued to oxidize and condition them before their reintroduction to the raw wastewater flow.

Activated (Stage) Aeration - Stage aeration consists of the division of activated-sludge treatment process into stages (i.e., two aeration tanks in series), with an intermediate settling tank between the aeration tanks. Sludge may be recycled or wasted within each tank or from one aeration tank to the other.

Step Aeration - Step aeration is a procedure for adding increments of settled wastewater along the line of flow in the aeration tanks of an activated-sludge plant. Return sludge is added at the head of the aeration tanks. The overall result is to produce a more heterogeneous mixture in conventional activated sludge.

Tapered Aeration - As the oxygen demand of the waste is gradually decreased, the demand for oxygen diminishes. The tapered aeration process takes the gradually decreasing oxygen into account by making more oxygen available at the head end of the tank ' use of more air diffusers in the aeration tank.

The advantages of activated sludge modifications with respect to producing a high quality secondary effluent becomes rather negligible when the nitrification requirement is considered.

5. Advanced Waste Treatment

a. Nutrient Removal (Spray Irrigation - see Part II.D.3, of this section for an extensive discussion of spray irrigation.) - At present, the Plant's effluent quality requirements set by DER require a high degree of total BOD removal and suspended solids removal. They also require a reoxygenated effluent of not less than 5 mg/l with adequate disinfection. The BOD consists of both carbonaceous and nitrogenous materials. The latter materials are essentially a conversion by oxidation of ammonia nitrogen and ammonia nitrogen complexes to the nitrate or nitrite forms.

(b) Phosphorus removal is not a requirement of the Plant and future removal requirements are doubtful. Presently, nitrogen removal is not required and it is anticipated that it will continue not to be a requirement by the State. However, nitrification, being a function of the proposed plant, will convert ammonia nitrogen to the nitrate form, a non-oxygen demanding compound.

In design of the Plant process and selection of process units, consideration was given to possible future increased treatment requirements. The removal of phosphorus compounds which act as nutrients in the growth of algae is being required on most streams in the eastern part of Pennsylvania. In the event phosphorus removal requirements were imposed, several courses of action would be open within the framework of the proposed Plant facilities; some would require the addition of capital facilities and all would result in increased operation costs due to chemical addition.

The selection of modifications to the Plant would depend greatly on the degree of removal required and the actual loading on the Plant at the time of action.

Techniques that would be considered and their relationship to the Plant would be:

(1) Addition of a Mineral Salt Before the Primary Clarifiers. If a phosphorus removal requirement of up to 95% were imposed, it would be possible to remove total phosphorus by the addition of a mineral salt such as alum, sodium aluminate or an iron salt, each of which would react with the phosphorus compounds and create an insoluble precipitate that could be collected in the primary clarifiers. The dosages of chemicals (cost) would be a function of the degree of removal required.

The facilities required to use this process would be a rapid mixing system to disperse the chemicals and a slow gentle mixing action to assist in coagulating the particles for improved sedimentation in a quiescent zone. In a plant of this capacity and in the Philadelphia area, provisions would be required for the storage of both chemicals in liquid form.

To accomplish the method of treatment, it would be necessary to add bulk chemical storage and chemical feeders. Additional sludge production would result from the chemical reaction.

The advantages of this system are:

- Minimal capital investment in additional facilities.
- The ability to remove relatively high percentages of phosphorus (90%) without major adverse effects on the downstream biological system because of pH shifts.
- High reduction of organic loads (increased BOD removal in the primaries along with phosphorus).
- Good ability to control the process.

Its disadvantages are:

- Relatively high cost of the mineral salts.
- Prohibitive chemical recovery costs.
- Increased sludge production.

(2) Addition of Lime Before the Primary Clarifier. If removals up to 80% are required, it is possible to precipitate insoluble phosphate compounds in the primary clarifers by raising the pH from 9.5 to 10 with lime. The mechanical requirement to mix and settle is essentially the same as for alum or a ferric salt. A high degree of recirculation is often required to achieve efficient removal of phosphorus.

For a plant this size, a more complex system for storage and feeding chemicals would be required for lime than for mineral salts. However, with the local availability of lime and its relatively low cost, the economics of lime use would be worth investigating.

The advantages are:

- Low cost of raw materials.
- Increased removal of BOD and suspended solids in the primaries with resultant improved performance in the biological system and reduced quantities of difficult to handle biological sludge.
- Minimal investment in the feed system.
- More stable sludge because of high pH.

Its disadvantages are:

- Handling comparatively more difficult than minerals (dirt and scaling).

- Greater quantities of sludge produced.

- More limited phosphorus removal because of the pH effect on downstream facilities.

(3) Mineral Addition to Aeration Tanks. It is possible to add alum or iron directly to the aeration tanks and insolubilize phosphates in the activated sludge medium. The basic reactions are the same as described in (1).

The advantages are:

- Simplicity of operation, with minimal control required.

- Better dewaterability of mixed activated and chemical sludges, with minor increase in solids production.

The disadvantages are:

- No practical ability to recover chemicals for reuse.

- No anticipation of direct improvement on BOD reduction in biological system since total load is applied to the system as compared to the two previously described techniques where organics are reduced ahead of this system.

Comment: This is a very simple and economical process; but for other considerations, it probably would not be used alone. If removal in the primary stage were employed, an additional point for application of mineral salt would be provided at the aeration tanks which could enhance the overall removal of phosphorus.

(4) Removal of Phosphorus After Biological Treatment. It is possible to remove the phosphorus by the addition of a mineral salt or lime after biological treatment.

The advantages are:

- No influence on biological treatment; therefore, very high levels of reduction can be achieved without interference and sophisticated control can be employed.

- An improvement in overall treatment, including BOD and solids removal.

- The chemical recovery of the lime in a recalcinated form which is technically possible and makes the economics of the process marginally feasible for an 8 mgd plant.

Whether a single or two-stage treatment is used, additional studies would be required.

The disadvantages are:

- The capital cost would be relatively high.
- A higher operation skill would be required, and greater maintenance cost could be expected.
- With lime, a final pH adjustment would be required to protect filters from scaling and to comply with the quality requirements for the effluent.

Comment: This system would be employed only in the case of extremely high treatment requirements or if a very good economic picture as related to chemical recovery was desired.

(c) Nitrogen Removal, as mentioned earlier, is not anticipated to be required by the State. If it did become a requirement, there are techniques being developed which could accomplish the removal of nitrogen (N) from the water to the air. A denitrification process by biological means would probably be employed. There are some data available to indicate that the conversion of nitrates could be accomplished to a degree in filters; however, it would be necessary to do experimental work to accomplish this. Other techniques such as the reduction of nitrate with ferrous sulfate and breakpoint chlorination could be investigated and adapted to the proposed system if found technically and economically feasible. Ammonia stripping, another nitrogen removal process, involves the agitation of wastewater in the presence of forced air blasts. Ammonia ions escape into the atmosphere as a free gas.

3. Treatment Site Location

Several site locations for the treatment facility were examined in addition to the proposed project site. The sites were rated on a number of criteria of which the following were included: compatability with a "regionalization" concept, effluent and sludge disposal locations, flooding potential, available acreage, aesthetic considerations, ease of access, proximity to residential zones, and ability to take the fullest advantage of gravity feeders (sewers).

The alternative site locations to the proposed site were the following:

1. A portion of the Freedom Foundation and Girl Scout complex just off Pennsylvania Route 23 in Schuylkill Township.

2. A farm located essentially adjacent to the Girl Scout complex.

3. The existing Oaks Treatment Plant located at the confluence of the Perkiomen and Schuylkill Rivers.

4. Two plant scheme:

   A 2 mgd plant to be located at the proposed site on the Schuylkill River to be built by the VFSA to serve East Pikeland, Charlestown and Schuylkill Townships. Tredyffrin would construct a 5.53 mgd plant on the Valley Creek to serve Tredyffrin, Malvern, East Whiteland, Willistown and Easttown. The projected annual operating costs assumed that the force main and high lift pumping station to Valley Forge would not be built. A considerably higher degree of treatment would be required due to surface discharge to Valley Creek. Accordingly, additional plant capital and operating costs were considered over a secondary plant. Utilizing spray irrigation as an alternative to effluent disposal recognizes that the pipeline and pumping station to Valley Forge would not be required but the cost of land and facilities to accomplish the land treatment is included. This scheme recognizes the need for secondary treatment only, in accordance with State law.

5. Two plant scheme:

   This alternative considers the separation of flows by the ridge line between the Crum/Darby Creek Basins and the Schuylkill River sub-basins. An estimate of flows was made for each of the basins. Malvern and Willistown have some service area in each basin. In regards to a plant at the Valley Forge site, the current degree of treatment was maintained in establishing costs for that plant. The cost of a plant on the south side of the ridge reflected the cost of a high degree of treatment when surface discharging. In consideration of spray irrigation as a means for effluent disposal, the plant costs were reduced to reflect secondary treatment. Accordingly, the elimination of piping and a pumping station to convey sewage over the ridge was considered.

6. Three plant scheme:

   This alternative would utilize three plants, one at the proposed Valley Forge site, on on Valley Creek and one on Crum (or Darby) Creek. Individual service areas contribute the flow dictating the size of each plant. Naturally, pertinent deletions and additions were made to the project costs to reflect a spray irrigation alternative at each site.

Note: Reference is made to Section I.C., "Brief History of the Proposed Project and Grant Application" for further discussion of other alternative attempts to service the area, which were rejected for the reasons set forth in that section.

Alternatives 1 and 2 were eliminated due to their very high elevations, limited size, proximity to populated areas and proximity to areas of national historic significance.

Alternative 3, locating the source of treatment for the service areas at an expanded Oaks Treatment Plant, was discussed generally in Section I.C. As mentioned in Section I.C , an extensive study on the subject alternative was made jointly by the Montgomery County Sewer Authority and VFSA, the results of which study recommend the construction of both plants. (A copy of this report, including environmental impact aspects and cost comparisons is included in Appendix 1 Exhibit 3.)

For a more extensive discussion of these alternatives and their evaluations, see subsection D of Part II entitled "Structural Alternatives", *infra*.

C. Sewer Line Locations

Due to the complexities of a system, this discussion is geared more towards the alternative routes of interceptors and force mains needed to serve the proposed service areas.

Several schemes were evaluated on the basis of cost effectiveness, environmental impact (both short and long term) and social factors.

Plate 3 shows the locations of the proposed sewer lines and pumping stations for the Initial Service Area. With the exception of the interceptor line and force main passing primarily through Tredyffrin Township from the intersection of Swedesford Road and Little Valley Creek to the Valley Creek Pumping Station (before being force mained across the Schuylkill River on its way to the Plant), almost all the proposed sewer lines represent what is believed to be the best possible combination of environmental, economic and engineering considerations. (See Sections I.C , "Brief History of the Proposed Project and Grant Applications" and V.A , "Description of the Proposed Wastewater Treatment Facility" for a discussion of the history of the system and the alternative approaches in locating sewer lines, including the Trout Run and Phoenixville proposals which were rejected and subsequently resulted in the Pennsylvania 537 Plan being revised to adopt the Plant as the sub-regional plant). The one sewer line in question runs approximately parallel to Valley Creek through undeveloped land of which 865 acres is presently under consideration for the "Chesterbrook Development", a proposal for the construction of homes, apartments and office buildings.

An alternative has been proposed and evaluation requested by a number of interested parties (Appendix 4 Exhibit 1). The alternative location for this section of line lies approximately 1½ to 2 miles west of the proposed route. In lieu of following the gravity feed of the Little Valley and Valley Creeks, this alternative would essentially swing from the Swedesford Road-Little Valley Creek intersection, northwesterly through Great Valley Mills, run under the Pennsylvania Turnpike, climb over Diamond Rock Hill and Mount Misery, and then parallel Country Club Road as the line made its last leg to the proposed treatment plant.

This alternative route, or one very similar to it, was investigated by the consulting engineers for Tredyffrin Township, Gannett, Flemming, Corddry and Carpenter, Inc. Information supplied by the engineers included an evaluation of the proposed route and the two alternative routes. Construction costs, power costs and diagrams for all three routes are presented in a table found in Appendix 4 Exhibit 2. Examination of this information reveals that the proposed route has lower construction costs and power costs associated with it, primarily due to the alternative's high pumping and energy costs required to carry the wastes uphill.

During the public hearing on the Draft EIS and proposed project on January 10, 1974, concern was raised by a representative of the Philadelphia Conservationists, Inc., as to a force main and gravity sewer planned to service the Daylesford area of Easttown Township. As proposed by Yerkes Associates, the sewers would parallel Darby Creek the entire length of the Sharp's Woods Nature Reserve for approximately 2,000 feet, as well as traversing the property at three additional locations.

In order to mitigate the damages to the Nature Reserve, EPA requested Yerkes Associates to meet with the concerned environmental group to resolve this matter. As a result, a relocation of the sewer lines in question was agreed to, which will minimize the environmental impacts on the Reserve. A letter indicating the agreement on the new location of sewers has been included (Appendix 4 Exhibit 4).

D. Effluent Disposal

The following alternative effluent disposal techniques have been evaluated in lieu of the proposed method:

1. Deep Well Injection - A deep well may be defined as a well located in a formation far below the surface and isolated from any fresh water strata.

Deep well disposal is best used for concentrated, toxic, radioactive or odoriferous waste produced in an area of limited stream flow. Fundamentally, the method consists in the storage of unusable water in the pores of a formation already containing unusable waters. Since this concept is not within the scope of solving this area's water quality problems, deep well disposal has been rejected.

2. Shallow Well Injection - The shallow well injection method does provide a more useful benefit in the disposal of wastewaters. Although shallow wells are more economical to drill and maintain than deep wells and they serve to recharge groundwater supplies. It is a more costly method than the proposed method of disposal, and increases the possible degradation of potable water supplies from toxicants and pathogens. For these reasons it has also been rejected.

In assessing the feasibility of well injection in this case, the EPA's Administrator's Decision Statement No. 5 April 2, 1974, Subject: "EPA Policy on Subsurface Emplacement of Fluids by Well Injection", was consulted and utilized in the evaluation of this alternative.

3. Inland Streams (other than the proposed receiving stream) - Discharging the effluent to a stream other than the Schuylkill River (e.g. Valley Creek, Crum Creek) would result in having to locate the treatment plant/plants also inland. This location would not take advantage, for the most part, of natural drainage patterns and would result in greater expenditures (as discussed in greater detail in Part II.D. of this section). However, if this were the case, discharging the effluent to the smaller stream would have the following advantages and disadvantages:

Advantages -	Augmentation of surface water flows. Possible reuse of effluent waters through aquifer recharge in the Treddyffrin Township area (see Plate 12). Less potential flooding damages to treatment facilities.
Disadvantages -	Limited assimilative capacity requires a high degree of treatment of sewage before disposal. If plant breakdown occurs, there is no readily accessible point of discharge. Costs escalate exponentially with degree of treatment. There is more flooding potential downstream of the treatment plant due to increased flows, especially in the area of Valley Forge State Park. Reduction of a cost-effective service area (initial land potential) possibly resulting in higher annual service rates.

4. Land Treatment (Spray Irrigation) - The concept of spray irrigation has recently become a rather popular method of wastewater effluent disposal and as the final stage of an advanced waste treatment process. The design and operation of facilities classed as land treatment must recognize and accommodate both the qualities of the applied wastewater and the qualities of the natural conditions of the treatment site. The end product is treated, pure effluent. This often requires pretreatment and possibly considerable capital investment. The "Spray Irrigation Manual," recently published by DER, requires the equivalent of secondary treatment of organic wastes, including disinfection for pathogens prior to disposal by spray irrigation. Spray irrigation does allow the elimination of facilities for nutrient removal and allows water to be returned to the ground.

There are many advantages and disadvantages associated with spray irrigation and many of these can be specifically discussed in relation to the Valley Forge proposed project. Due to the possibility of adopting land treatment as an effluent disposal technique, further and more detailed discussions will appear under Part II of this Section, "Development and Evaluation of Alternatives for Wastewater Treatment Systems or Combinations of Systems".

E. Sludge Disposal

The sewage treatment process consists of removing particulate matter directly from the influent or converting it from one form to another and then removing it from the carrying water. The matter is then dispersed in the air, placed in or on the ground, or disposed of in the water.

The particulate matter is removed from the system as a wet sludge which is an unstable compound. Processed properly, the material does have value as a soil conditioner; and, while not as effective as many fertilizers, it is not without usefulness.

Generally, there are three available disposal methods for sludge: (1) disposal into the same or another body of water after processing; (2) disposal on the land as a soil conditioner or fill; and (3) since the sludge in this case is largely organic in matter, disposal by incineration, leaving a residual innocuous ash.

1. Disposal in Water

During the development of the proposed action, each of these alternatives were considered, including disposal in water. Digested sludge could either be disposed of in a river or at sea, depending on the distance to the disposal sites and constraints placed on such disposals. The main advantages of disposal in water are the ease, economy and efficiency if the disposal sites are nearby. The disadvantage is deterioration in quality of the receiving body of water which far outweighs the advantages of this alternative. River disposal, therefore, is a self-defeating alternative and would violate current stringent water quality standards.

The possible non-river points of disposal in water for this project are the lower Delaware Bay or Atlantic Ocean which are more than one hundred miles from the proposed Plant site. The practicality and cost of this method, therefore, are prohibitive for a plant this small. Furthermore, the Marine Protection, Research, and Sanctuaries Act of 1972 (P.L. 92-532), popularly called the "Ocean Dumping Act of 1972", requires studies and investigations for the purpose of determining means of minimizing or ending all ocean water dumping of materials by 1978.

2. Land Disposal

Wherever feasible, the aim should be to dispose of sewer sludge by agricultural utilization, particularly if suitable areas of land are available close enough to the sludge digesters. Disposal of sludge directly onto the surface of the ground represents an inexpensive method that could provide beneficial value to the soil or farmland. However, the potential for groundwater pollution remains a question at this time, necessitating further study.

Sometimes, where direct application of the sludge for agricultural use is not economical or practical, the sludge may be buried or landfilled at a state approved landfill site. Once again, this is an economical and feasible method of sludge disposal which requires a relatively small capital investment, improves farmland condition due to fertilizer value of the sludge and provides a final and complete disposal.

Subsurface disposal is a suitable method only for sludges that have been stabilized so that no decomposition or nuisance conditions will result. Advantages lie in its low cost and minimal land surface requirements. Disadvantages include high capital and operating costs.

3. Incineration

Incineration of sludge is generally considered to be more expensive than other sludge disposal processes. However, with the increase in the population served, the economics become favorable especially for large service areas. Incineration is the final step in a series of processing steps designed to reduce sludge volume before disposal. Sludge handling processes such as incineration require pretreatment of sludge which includes grit removal, blending, thickening, conditioning and dewatering.

There are various incineration processes. The capital and operating costs of incineration systems depend on the type and size of incinerator, nature and amount of sludge, and whether deodorization, dust collection and disposal are included. Supplemental fuels are invariably required for sewage sludge incineration but their requirements fluctuate depending on the characteristics of the sludge which are then reflected in the operating costs.

Advantages associated with incineration are generally accepted as being:

a. practical and economical for sludge disposal in larger service areas.

b. most efficient in handling greases, oils, screenings and organic industrial wastes.

c. less likely to pollute groundwater after sterile ash is disposed of.

d. compact.

e. realibility as a method of sludge disposal.

The disadvantages of incineration are:

a. high capital and operating costs.

b. added cost of pretreatment steps.

c. potential air pollution problems.

d. need for auxiliary fuel to achieve good combustion.

e. does not provide an ultimate means for sludge disposal since the ash must also be disposed.

PART II - Development and Evaluation of Alternatives for Wastewater Treatment Systems (composed of the sub-parts evaluated in Part I) or Combinations of Systems.

A. No Action

The consequences of a "no action" alternative are basically an acceptance of the conditions as they now exist. There are approximately 10,600 homes in the Design Service Area. A conservative estimate given by the municipalities indicate that up to 3,800 homes to be served are experiencing some form of problem with on-site subsurface disposal systems.

If a subsurface disposal system fails as a result of deficiencies within the system and if lot sizes are sufficiently large, it may be possible to replace all or part of the system on the homeowner's lot. Due to limitations such as lot size, water source and costs, there is a limit to the number of systems which can be replaced on a given lot. If the subsurface disposal systems are failing due to physical conditions such as high groundwater table or shallow bedrock depth, replacement of the systems will probably not alleviate the problem and unsatisfactory conditions will continue.

Once again, reference is made to the statement provided by the Chester County Health Department on the eventual failure of septic tanks that presently function properly. See Section I.D., "Purpose of the Proposed Project" and Appendix 2 Exhibit 4.

Depending on the extent of malfunctions, there is a significant potential for public health hazards to develop and, in fact, several cases of hepatitis have been recorded within the Design Service Area. In addition to public health hazards, malfunctioning subsurface systems will lead to aesthetically unappealing sights and odors, and cause a direct socio-economic impact (as the areas in which these homes are located become less desirable to live in, real estate values depreciate and properties become more difficult to resell).

If local communities should decide to "do nothing" about wastewater disposal problems, it is probable that building could continue with additional potential malfunctioning systems being constructed. If this should occur, it is also probable that the state would impose severe building restrictions on these communities as it already has done in some areas. Restrictions on building could impair a community through loss of tax revenues which would otherwise come from new construction.

Should the most adverse conditions develop under a "do nothing" program, it is possible that land developers could provide privately owned and operated wastewater systems for their developments. While municipalities are usually dependent on substantial governmental aid and often must conform to regionalization of facilities to receive funds, private organizations which meet the legal requirements for discharges to streams are entitled to sewage permits. This could lead to a multiplicity of small wastewater treatment plants scattered throughout the area operated by several different organizations, often without sufficient supervision. The capital cost of such facilities would be passed on and included in the purchase price of the homes or establishments served. For comparison purposes, a very broad estimate indicates that the cost of a new home would include approximately $2,200 for sewers and treatment facilities while a subsurface facility for the same home would require about $750. Replacement cost for a tile field or seepage bed would probably be around $400. DER, however, has begun to regulate the number of privately owned treatment plants in accordance with state planning requirements, and the risk of failure of such private wastewater facilities is generally regarded as greater than municipally owned facilities.

B. Nonstructural Alternatives

A number of nonstructural measures have been taken by state, county and local officials to alleviate the present problem. Almost all nonstructural measures are oriented toward minimizing density to prevent overloading the natural resources available. The eight municipalities to be served by the Plant have adopted various nonstructural measures in an attempt to arrest the spread of existing sewage problems.

The municipalities have comprehensive planning and zoning which in many cases require large lot sizes to prevent overcrowding and provide sufficient area for subsurface disposal systems. Among the requirements which control building are provisions for soil suitability and percolation tests. This is a state-mandated and locally administered and enforced requirement to insure that new homes will have adequate sewage disposal systems. The state also retains the power to restrict any development it deems unsuitable unless adequate measures are taken to prevent surface and groundwater pollution.

A potential extension of state-imposed building restrictions could allow existing structures to remain but prohibit further building of any type from occurring within designated areas. Under this concept, sewage facilities would probably still be required in the developed areas.

Basically, two nonstructural measures may be applied to existing conditions - condemnation and the use of holding tanks.

Condemnation proceedings would involve purchasing all or most of the homes in the Initial Service Area, razing the buildings and converting the developed areas to open space, with any future construction prohibited. Assuming an average value of $30,000 per home, the condemnation and purchase of homes only are estimated at $318,000,000.

The second nonstructural measure to alleviate the sewage problems is to convert existing septic tanks into holding tanks and provide holding tanks for new homes. For a family of three, a 2,000-gallon tank would have to be pumped on an average of once a week at a cost of $30 to $45. The capacity of existing septic tanks is probably smaller than 2,000 gallons, and the tanks would need to be pumped more frequently at an increased cost. Annual costs for holding tank service would probably run between $1,600 and $2,300. In addition to a sewage collection system, a treatment facility would still be necessary to process the waste.

In light of the impracticability of condemnation, the excessive annual costs associated with holding tanks, and the fact that a water quality problem does exist, any attempt to alleviate the existing problem necessitates the construction of some type of treatment facility. However, building restrictions as noted previously and strict adherence to zoning and development control ordinances and the comprehensive land use plans could prove to be a most effective solution in preventing additional problems. See Section VI, "Conclusions and Recommendations".

C. Combination of Structural/Nonstructural Alternatives

A structural/nonstructural approach to the alleviation of sewage treatment problems has became the major avenue that municipalities follow when presented with the burden of treating wastes from both an economical and environmental aspect.

Through advanced technology, the creation of the "distoilet", a waterless commode with built in incineration for disposal has provided a means to rid a household of wastes and yet not necessitate the construction of a treatment facility. This mechanism, in conjunction with strict adherence to zoning ordinances, building codes, etc., represents in essence a solution to the water quality problems of an area via a structural/nonstructural approach. Due to the relative "newness" of the distoilet and its limited use to date, a more intensive investigation of this possible solution was beyond the scope of this EIS.

Although the proposed action is predominantly of a structural nature, the final comprehensive water quality plan will include structural and nonstructural components. Provisions will be made for the adequate supervision and control of sewage. The nonstructural measures will probably include capped sewer ordinances requiring developers to provide structural components (sewers) within their developments so that service may easily be extended to the subdivisions. Use of zoning and land use controls will restrict or prohibit building in areas with known problems. Areas that are too remote to be served by public sewer service but are desirable for development will continue to be subject to requirements for minimum lot sizes, soil suitability and percolation tests and all other applicable state laws.

A rational balance of structural and nonstructural components will achieve the greatest environmental enhancement with the least cost and provide the most beneficial socio-economic framework within which the area may develop.

D. Structural Alternatives

For reasons cited earlier in this section regarding alternative means for correcting the existing problem, the number of feasible structural alternatives have been reduced to include only those thought practical enough to devote more time to evaluation.

Alternative methods of treatment must be capable of producing a plant effluent in accordance with DER's requirements. A permit (No. 1571405) was issued by DER on August 13, 1972 to allow discharge to the Schuylkill River. As stated in the permit, the proposed wastewater treatment plant must be capable of producing:

1. 95% reduction of total biochemical oxygen demand (BOD) from May 1 to October 31, including oxygen demand of carbonaceous, nitrogenous and certain chemical-reducing compounds;
2. effluent with suspended solids not exceeding 15.0 mg/l;
3. effluent with dissolved oxygen equal to or exceeding 5.0 mg/l; and
4. effective disinfection of disease-producing organisms; provision for satisfactory disposal of sludge; and reduction of the quantities of oil, grease, acid, alkalines, toxic taste and odor-producing substances inimical to the public interest, to levels that will not pollute the receiving stream.

It has become quite obvious that the criteria mentioned above and throughout this section have, for the most part, eliminated all types of treatment except for activated sludge and pure oxygen processes. Due to its unavailability at the time of design conception, the pure oxygen processes have been eliminated only for the initial construction phase. However, as discussed earlier in this section (Part I, subsection A.3., "Pure Oxygen Processes"), the oxygen processes will be able to be utilized and easily added to any activated sludge process if found to be the most efficient way to go in the future and if it is necessary.

Consequently, the activated sludge process and its variations represent the method of treatment necessary to meet the state standards over a consistent period of time.

Although each various modification of activated sludge basically accomplishes the same result of BOD_5 reductions, the differences between processes are primarily tankage volume and/or air requirements which have a direct correlation to initial capital expenses and annual operating costs. Also the requirement of nitrification must be taken into consideration when evaluating each system.

In light of the established criteria and the goals and objectives to be achieved, wastewater treatment facility systems have been integrated for evaluation. Due to public concern raised at the public hearing and by comments received on the Draft EIS, additional alternative schemes have been evaluated.

Since several of the alternatives that have been evaluated represent a multiple plant approach, a breakdown of flow quantities for each of the service areas is presented. These flows are in accordance with Township projections and reflect a total equivalent population of 75,300 for the year 1985. (See Section V, "Proposed Project".)

Table IV-1 shows the various multiple plant schemes and their capacities. Capacities were established equaling the proposed action capacity of 7.53 mgd or a nominal 8 mgd (See Section III.D.3., "Estimation of Sewage Flows".)

With regard to costs of the alternatives, the absolute costs would be somewhat less for less total capacities (disregarding inflationary impact for redesign delays, etc.); however, the comparisons would remain valid.

An up-to-date analysis of alternative approaches for disposal of wastes from the Design Service Area are:

1. 8 mgd activated sludge plant at the proposed Valley Forge site with effluent disposal to the Schuylkill River and sludge disposal via incineration.
2. 8 mgd activated sludge plant at the proposed Valley Forge site with effluent disposal to the Schuylkill River and sludge disposal via landfilling.
3. 8 mgd activated sludge plant at the proposed Valley Forge site with effluent disposal as spray irrigation and sludge disposal as landfilling.
4. Activated sludge plant at the proposed Valley Forge site to handle existing needs only.
5. Two plant scheme: a 2 mgd activated sludge plant on the Schuylkill River to handle the needs of VFSA (Charlestown, E. Pikeland and Schuylkill Townships) and a 5.53 mgd plant on Valley Creek to handle the needs of the other communities. Effluent disposal has been evaluated taking into consideration spray irrigation as well as surface discharge. Sludge disposal will be via landfilling.
6. Two plant scheme: A 5.43 mgd activated sludge plant on the Schuylkill River site to handle the wastes in the sub-basins of the River and a 2.10 mgd plant on Crum

TABLE IV-1

ALLOCATION OF PLANT CAPACITIES (MGD)

	SCHEME I Alt. 1,2,3	SCHEME II Alt. 5		SCHEME III Alt. 6		SCHEME IV Alt. 7		
	V.F. System	Schuylkill Plant	Valley Creek Plant	Schuylkill Plant	Crum Creek Plant	Schuylkill Plant	Valley Creek Plant	Crum Creek Plant
VFSA	2.00	2.00		2.00		2.00		
Tredyffrin	1.50		1.50	1.50			1.50	
E. Whiteland	1.60		1.60				1.60	
Malvern	0.53		0.53	0.13	0.40		0.13	0.40
Willistown	1.00		1.00	0.20	0.80		0.20	0.80
Easttown	0.90		0.90		0.9			0.90
TOTAL	7.53	2.0	5.53	5.43	2.10	2.00	3.43	2.10

Creek to handle the needs of the areas lying south of the ridge line. As Table IV-1 shows, Malvern and Willistown would have their flows split. Spray irrigation and surface discharge are both taken into consideration for the analysis. Sludge disposal is via landfilling.

7. Three plant scheme: A 2.0 mgd plant on the Schuylkill River to service Charlestown, E. Pikeland and Schuylkill Townships; a 3.43 mgd plant on Valley Creek to service those areas in that Basin; and a 2.10 mgd plant on the Crum Creek to service areas south of the ridge line. This scheme takes into consideration optimal gravity feed lines. Again, spray irrigation and surface discharge are evaluated and landfilling is the method of sludge disposal.

Evaluations:

1. 8 mgd, Schuylkill Effluent, Sludge Incineration - This 8 mgd plant would incorporate a completely mixed activated sludge process and be located on the west bank of the Schuylkill River approximately opposite the confluence of the Schuylkill River and Perkiomen Creek. The raw waste would be treated and the effluent would be discharged to the Schuylkill River via a short outfall pipe. Incineration would be used as the sludge disposal method, reducing the sludge to an innocuous ash before disposing in the landfill. Pollution control equipment installed in the incinerator would ensure that the emission characteristics would be within DER standards. As Part I of this Alternatives section pointed out, incineration does possess several advantages over other sludge disposal techniques. However, in light of inflationary trends for construction materials, the need to maintain proper operating efficiencies to meet stricter air quality standards, the potential air pollution problems, the rising cost and dwindling supplies of fuel for combustion, the lack of general public acceptance, and the need to still dispose of the ash which remains after incineration, this Agency has encouraged the recycling of the sludge as a land spreading or landfilling operation. The applicants, county and state are in complete agreement and the applicants have pursued the method of landfilling the sludge. Alternative 2 will discuss this aspect in more detail.

The project cost associated with constructing the incinerator is approximately $400,000. At design conditions (8 mgd) the incinerator would produce about 14,000 lbs/day residue. The annual costs of operation would be approximately:

Amortization	$27,774
Power	27,600
Fuel	14,000
Labor	10,000
Maintenance	3,000
	$82,374

The estimated annual costs associated with this alternative would be $623,400.

2. 8 mgd, Schuylkill Effluent, Sludge Landfilled - This alternative is identical to the first alternative, except that it substitutes landfilling operations as the method for sludge disposal. It is important to note here that at the time of the design of the proposed project no viable land disposal alternative was available. Since that time, however, the owners of the Knickerbocker landfill have indicated their willingness to accept the heat-treated (equivalent to digested) sludge from the treatment plant; the landfill has a DER permit.

VFSA would haul sludge to the landfill site or have sludge hauled by a qualified contractor selected through the public bidding process on an annual basis. The sludge would be processed through the heat treatment process or its equivalent (digestion) to stabilize it and then be dewatered to a cake (about 30-40% solids). The material would then be suitable for filling or land spreading.

The Knickerbocker landfill is in East Whiteland Township off of Route 29 near the Great Valley exit on Route 202. An asphalt membrane under the fill has been designed to prevent contamination of groundwater. Leachate is collected and hauled out of the project area by a qualified private firm who arranges for treatment and disposal.

A cost comparison of the incineration process and the land fill operation indicates that an annual savings of about $44,000 would be realized if the proposed action were modified to eliminate the incinerator and haul sludge to that fill. The usable life of the fill is 10 to 15 years.

Land spreading of the treated sludge is an alternative that necessitates further study before it can be done safely without the fear of groundwater contamination. Assuming negotiations, which are currently in progress,* are carried through by the Authority with the landfill owners and appropriate permitting agencies, landfilling of the sludge will be the method of sludge disposal for the proposed action. In addition, this Agency has been informed by VFSA that efforts to land spread the sludge at a future date will be continuously explored by the participating authorities for both conservation and economic reasons.

Preliminary indications show that at design conditions of 8 mgd, the Plant will produce approximately 22 to 25 cu. yards/day. Annual costs estimated to haul and dispose of the treated sludge will be on the order of $36,000/year assuming $100 - $105 per 20 cu. yard haul. This in turn would result in one or two runs per day by the hauling contractor.

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* VFSA received a written "Statement of Intent" on August 14, 1974 from the Knickerbocker Landfill owners stating their intent to accept the sewage sludge from the VFSA treatment plant.

3. 8 mgd, Spray Irrigation, Sludge Landfilled - This alternative scheme considers the same design approach as alternative 2, except that the effluent from the Plant would be sprayed on land surfaces as a means of effluent disposal rather than discharging to the river.

The benefits derived from spray irrigating the effluent have been mentioned in several sections of this Statement. An additional savings could be attained by the elimination of process equipment costs such that the Plant would produce "secondary treatment" in accordance with DER requirements.

Throughout the discussion of alternatives in this section, treatment facility schemes utilizing spray irrigation have been addressed. However, in the discussion of this particular alternative, the spray irrigation method is discussed in more detail to provide the reader the necessary background for understanding the concept and practicability of adopting land treatment for each alternative.

In Pennsylvania, the spray irrigation concept has become increasingly popular and quite often successful. Since roughly 50% of wastewaters discharged to the land surface in Pennsylvania will infiltrate and recharge groundwater, all spray irrigation installations are considered discharges to the waters of the Commonwealth. As such, each installation requires a DER permit under the Clean Streams Law. A permit application, design report, plans and specifications are required for consideration of such a facility. The equivalent of secondary treatment must precede spray irrigation but due to the variability of the earth materials, effluent constituents, etc., treatment requirements and performance criteria must be determined on a site-by-site basis.

The prime consideration for site selection is the ability of the organic and earth materials to properly treat the wastes. Such features as the infiltration rate and the exchange capacity of the soils, soil texture, geological structure, depth, drainage and the presence of physical discontinuities must be evaluated. Also, the depth of the water table, its direction and rate of movement and quality are of prime considerations in site evaluation. Considerable seasonal variations in the height of the water table are common in Pennsylvania and will often make a site acceptable for certain seasonal use only.

Spray irrigation, as a rule, should be carried out only one day a week on a given section of land. Consequently, sufficient acreage must be available to allow for the soils to dry out and reaerate. Temporary moveable systems have proven to be singularly ineffective because of high operation and maintenance costs and considerable down-time for repairs.

In selecting a site for spray irrigation it is most important to carry out studies to evaluate the composition of the earth materials and sub-surface conditions (soils, geology, hydrology).

The texture of the earth materials near the land surface must be such that a direct, rapid movement (short-circuit) of the irrigated water to the groundwater table does not occur. Coarse sands and gravels, open fractures in bedrock and cavernous carbonate rocks are examples of conditions which may result in short circuits. The earth materials should be moderately permeable and of uniform quality in order to provide a slow but continuous downward movement of the infiltrating waste water.

A knowledge of the detailed characteristics and depth of soil is critical in determining the degree of renovation the wastewater will receive before reaching the water table. Deep, well drained, loamy soils are preferable for spray irrigations; extremes such as sands, silts, clays, and shaly and stony phases are unacceptable.

The soil characteristics become a significant constraint on the application rate of the wastewater and subsequently the acreage needed to apply the wastewater safely. Because it is felt that this aspect has direct bearing on the situation in the Valley Forge area and the sites investigated, the following soil descriptions with recommended applications rates have been reproduced in their entirety from the Spray Irrigation Manual issued by DER (Bureau of Water Quality Management Publication No. 31).

(a) Rapidly to moderately permeable, deep well drained soils are generally acceptable at the maximum rate of 2 inches per week.

(b) Rapidly to moderately permeable, moderately deep well drained soils have a maximum acceptable irrigation rate of 1.5 inches per week or less.

(c) Moderately slowly to very slowly permeable, moderately well drained soils on upland sites with seasonal high water table are generally acceptable only at rates of 1 inch per week or less; except for seasonal application, which may be at 2 inches per week during the summer and fall. These soils are unacceptable for use during periods when the seasonal high water table is present (usually in winter and spring).

(d) Groundwater in limestone terrains is highly susceptible to pollution because of the presence of solution enlarged openings with the rocks. Bedrock, which may be at or very near the surface, provides a ready route for wastewater to travel directly to the water table without being renovated in the soils. The addition of excessive amounts of water presents a severe hazard of sinkhole development. In these areas spray irrigation should be considered only if sufficient soil overlies bedrock and the renovative zone will not be bypassed. Application rates up to 2 inches per week may be approved in these areas upon submission of extensive supporting data on the depth of soils, the presence of near-surface bedrock and the development of sinkholes and undrained depressions within the spray field.

(e) Soils in flood plains have a high flooding hazard and seasonally high water table. In some cases flood plain soils which are well to moderately well drained may be acceptable for seasonal applications during summer and fall at rates up to 1.5 inches per week.

(f) The use of other soils is not normally acceptable, except where complete substantiating data is submitted to show the feasibility of the proposed installation. With some types of industrial wastes, particularly those high in metal cation content, data will be required concerning exchange capacities of the soil and changes in soil texture as related to the mineral characteristics of the waste. Experimental data may be requested to substantiate the retention of the exchanged waste after irrigation ceases while the soils re-equilibrate.

Also spelled out in this Manual are the four major geological factors to be considered in site selection. They are: structure and fracturing of bedrock; the lithology (composition of rock); the degree of weathering; and the texture and depth of glacial deposits.

Again taken from the Manual is a list of common rock types (Pennsylvania) with discussions of their suitability for spray irrigation.

(a) Sandstones - Most sandstones are strongly jointed with many of the joint sets open. Consequently, the degree of weathering is of prime importance as strong weathering tends to make permeability more uniform. Some poorly consolidated sandstones and deeply weathered graywackes and arkoses have uniform permeabilities and joints filled with weathering products. Sandstones with low secondary permeability (fracturing), moderate to high primary permeabilities and moderate to poor sorting are preferred. Poorly consolidated sandstones and deeply weathered graywackes and arkoses are the most suitable for spray irrigation sites.

(b) Shales - Most shale terrains are poor site choices because of high secondary permeabilities, resulting from fracturing. Those that have open fractures will short circuit wastewater directly to the groundwater. Some shales are deeply weathered and may provide adequate renovation of the irrigated wastewater. Others may be so tight as to reject infiltrating water, form a perched water table, and eventually discharge this water to the surface or cause surface water ponding.

(c) Carbonate rocks (limestone and dolimite) - In Pennsylvania carbonate terrains usually have a well developed soil mantle of variable thickness. The bedrock is typically fractured and highly cavernous. Groundwater movement is almost entirely via the conduits developed on the fractures. Surface streams are rare in carbonate terrains as most precipitation infiltrates through the soils to the solution passages. In fields where the overlying soils are thin and bedrock occurs near the surface and particularly where sinkholes have developed, the application of additional water by spray irrigation is likely to cause accelerated sinkhole development and surface collapse. Sites are preferred where the soil cover is thick and bedrock ledges or pinnacles are well below the surface.

(d) Coal Measures and Perched Water Tables - In much of the northern and western portions of the state, bedrock lies nearly flat. Lithologic units are relatively thin. The individual lithologies are extremely variable, both in lateral and vertical extent, with lenses, channels, and interfingering very common. As a result, the hydrologic and geologic conditions under two separate sections of a proposed field may be entirely different from each other. Typically these rocks have extremely variable permeability and can be classified as low yield aquifers and aquitards of usually limited spatial extent. As infiltrating water moves downward through these rocks, it travels primarily along fractures. Upon reaching less permeable layers, it ceases downward movement, ponds, and moves laterally. The result is a perched water table. The variability and limited spatial extent of the aquitards often results in multiple discontinuous, perched water tables. Ephemeral springs will often be found wherever these water tables intersect hillsides. Because of the limited and variable extent of the aquitard units, these perched water tables are often seasonal, depending upon the amount of infiltrating rain water. Since the water tables may be seasonal and the yield of water to test wells is usually low, extreme care must be taken in drilling test and monitoring wells to identify perched water tables. An experienced geologist will necessarily have to supervise drilling in these situations as most drillers will ignore a low yielding zone and drill through the aquitard. These perched water tables will react just as normal ones in preventing adequate renovation of infiltrating wastewater.

(e) Glacial Deposits - Glacial materials are extremely variable, but generally are only marginally acceptable for spray irrigation. Typical ground moraine has a fragipan (low permeability layer) developed high in the soil which create a seasonal high water table. Some soils developed on moraine material may be acceptable for seasonal operations at low application rates where fragipans are poorly developed. Sands and gravels typical of outwash plains and valley fills are generally unacceptable because of their high permeability which does not allow adequate residence time for waste water renovation.

The basic hydrologic considerations in evaluating a site are the depth of the water table, the rate and direction of flow, the location of natural groundwater discharge points, and the effects of the groundwater mound that may build up under the irrigation field.

High water tables, whether natural or resulting from increased infiltration, are unacceptable for spray irrigation, except in certain seasonal operations. The direction of the groundwater flow and the location of the natural discharge points determine the danger to other groundwater users in the area.

Idle fields, forested areas, grasslands and cultivated crop areas are generally suitable for spray irrigation. The type of vegetative cover is important both to wastewater renovation and water utilization through evapotranspiration. There are generally no restraints on the choice of vegetative cover, except that the cover should provide high evapotranspiration and prevent erosion and run-off. Acceptable slopes for the irrigation field may vary from a maximum of 4 to 8%

in most cases. Standard agricultural fields are acceptable for spray irrigation with slopes up to 4%; sodded fields and forested areas up to 8%

Design and engineering aspects have not been included in the previous discussions but it must be noted that there are strict provisions regarding treatment, storage, screening, controls, piping, sprinklers, distribution, diameter and spacing.

The information presented herein on spray irrigation was the primary basis upon which the spray irrigation alternative for the Valley Forge treatment schemes has been evaluated. However, each alternative has not been exhaustively studied due to time constraints. Pertinent information submitted by interested parties and comments on the Draft EIS regarding spray irrigation have also provided essential material helpful in the evaluations.

Dr. William E. Sopper, Professor of Forest Hydrology (Penn State University), provided comments on behalf of the Green Valleys Association on land treatment. The full text of his comments are included as an attachment to the Green Valleys Association's comments in an Appendix to this EIS. In summary, Dr. Sopper refuted information presented in the Draft EIS. Basically, he admits that a large block of land, contiguous to the Plant site, may be difficult to obtain for spray irrigation purposes and suggests that several small plants utilizing spray irrigation might be an easier solution but doubts this scheme's compatibility with a regional concept to wastewater treatment.

However, his research at Penn State University does show:

(a) No evidence to indicate that land used for spray irrigation must exclude the public. Open space and recreational areas have been produced for human use.

(b) Winter spray irrigation operations, using low pressure and low trajectory rotating sprinklers can keep damages to trees and food plants to a minimum.

(c) Winter spray irrigation does not form a continuous ice mat; does not restrict plant food from mammals and birds; and in fact, results of experimentation have shown that winter spray has actually provided more food to the animal inhabitants.

(d) Natural frost is more a problem than winter spray irrigations.

(e) Rabbit habitat is improved and deer have invaded these ice areas.

Further investigation into the feasibility of a spray irrigation system was conducted by Mr. Marshall Haws, Executive Conservationist for the Chester County Conservation District, at the request of the EPA. In summary, his report to EPA stated:

(a) "There are at least 2,200 acres of excellent soils suited to the land disposal of the nutrients from the proposed Valley Forge treatment plant, located not over three miles away.

(b) "This land should not involve a cost factor since it is state land, it can use nutrients to good advantage, and....could even produce income to the sewer authority."

The referenced area is the Valley Forge State Park comprised of 2,255 acres of which 600 acres are in Chester County and the remainder in Montgomery County.

Continuing from the short but concise report, "...the Park is planning for thousands of visitors during the Bicentennial celebration. These visitors will put severe traffic on the sparse vegetative cover that now exists on the Park lands. The vegetative cover, in order to withstand this traffic should be given adequate nourishment so that it will build up the root and crown growth that will withstand the foot traffic. This revitalization of the grass cover will help keep the soil from eroding, recycle essential water supplies and renovate the wastewater."

The report goes on to indicate the type soils making up the Park grounds and the fact that to support vegetative life, large amounts of nutrients are required. Mr. Haws suggests that the Park utilize the nutrients available from the sprayed effluent rather than having to purchase the rock phosphate, potash and nitrate formulations needed as plant fertilizers.

Several pertinent points are discussed in the book Green Land Clean Stream (Temple University) all of which display relevance to this particular alternative, e.g., "... the Penn State rule of 129 acres of 1 mgd is almost a maximum rather than a mean upon which any calculations of acreage must be based..." Continuing, "Another source of land...is public parks, game lands and other public open land." The book suggests Fairmount Park in Philadelphia as an example of such land, and adds that "...privately owned land is available at little or no cost to land treatment. Wastewater usually contains nutrients which have a real dollar value when compared to commercial fertilizer."

Mr. Haws suggests that it would be "justifiable for the state owned Park land to pay some token fee for the nutrients that it uses beneficially."

The report also states that considerable acreage is available and suitable within a five mile radius of the proposed treatment site both in Chester County and Montgomery County. The Townships of Charlestown, Schuylkill and East Whiteland were mentioned as possible irrigation areas.

The aspect of recycling water via spray irrigation from the Plant should also be the objective of any developer in the area who will be supplying his own package treatment plant.

Mr. Haws suggests that those areas in which the soils were not adequately drained could be fashioned into waste stabilization pond sites. The effluent from these pond sites would then be irrigated over open areas and areas where lush vegetative growth is desired. Consequently, some of the water lost to groundwater supplies, through run-off, by impervious ground cover could be somewhat replaced by recharging the groundwater through land treated effluent.

The full text of Mr. Haw's report plus a summary has been included in Appendix 4 Exhibit 3.

In a letter (February 11, 1974) submitted to EPA by Annamaria Malloy, Chairman of the Valley Forge State Park Commission, it was stated that the Park would not accept a spray irrigation system on Park grounds at this time and, in addition, the Commission was in the midst of its own study of the possibility of spray irrigating portions of the Park at a later date.

The spray irrigation alternative for the proposed 8 mgd facility at its Valley Forge site was evaluated based on all available information and maps supplied in this EIS (those supplied to EPA and those generated by EPA personnel).

Using the DER Manual and reviewing the existing hydrologic, geologic, topographic and soil conditions in the area of the Plant, an application rate of 1 in. per week was established. Based on the information, it was felt that in some areas could actually receive over 1 in. per week but these areas did not provide sufficient acreage. Also, in some areas designated on the soils maps as probably suitable or suitable with restrictions, it is conceivable that the application rate would be substantially less than 1 inch or that spray irrigation would not be permissable at all.

Suitable areas were narrowed down to the southern portion of Schuylkill and Charlestown Townships. Most of this area is characterized by moderately deep, usually well drained soils with slopes between 0-15% for the most part. However, closer examination indicates areas of steeply sloping land interspersed with the "flatter" lands. The major restriction of these soils is the nearness to bedrock.

Certainly, as noted earlier, any attempt to spray irrigate these areas would necessitate intensive exploration and detailed studies.

In order to operate through extended cold periods, an impoundment is required. For this latitude a 3 month period of potential impoundment was considered. At the 7.53 mgd level a minimum of 2,640 acres would be required including 100 acres for a 668 million gallon impoundment. The 2,600 acres need not be in one location but must be within the area preferably near a treatment plant site to be practical. However, DER has found historically that breaking up the system on land areas has resulted in high operation and maintenance costs in addition to considerable down times for repairs.

The unit land costs used were reviewed by an appraiser familiar with the area, and generally were established as follows:

(a) In the eastern end of the Study Area (i.e., Tredyffrin part of Great Valley), land cost with potentially suitable topographic conditions was estimated at $14,000 per acre.

(b) In the western and northwestern area (i.e., Southern Charlestown, East Whiteland and southern East Pikeland Townships), a land cost of $6,000 per acre was used for land potentially suitable from a topographic viewpoint.

(c) In the Crum and Darby basin a land cost of $6,000 per acre was used.

EPA considers the cost of the spray field lands as an eligible cost for a grant since it is considered a part of the treatment process. Normally the cost of lands associated with projects such as sites for plants, pumping stations and rights-of-way are not eligible for Federal funding. The figures cited above and the fact that land acquisition is an eligible cost have been used to complete approximate cost comparisons.

Since the soils in the area of the proposed Plant normally vary in their suitability due to questionable drainage and depth of soil, it is not recommended that spray irrigation be adopted until further detailed explorations are conducted.

From a cost standpoint, the estimated annual cost of this alternative (utilizing spray irrigation) is $1,742,500. Assuming landfilling operations as the chosen method for sludge disposal, the annual costs drop to roughly $1,700,000.

4. A less than 8 mgd plant - This alternative would be similar to the scheme just discussed but would service only existing needs. Although at the time the proposed action was designed, the servicing of existing needs would have resulted in a 4 mgd treatment plant, the current demand is closer to 4.8 mgd and by the time the Plant and sewers are on line (1977) the demand should approach 6 mgd.

Serving existing needs in the service area is not a viable alternative. EPA has substantiated the equivalent population figures and projections as submitted by the applicants, calling for the construction of an 8 mgd plant to serve the needs of the Study Area in 1985. (See Section III.D.3, "Estimation of Sewage Flows".) Based on the cost figures supplied, any plant less than 8 mgd would not be cost-effective and not in keeping with EPA mandates. Based on population projections and EPA's substantiation of growth that will occur in the next 10 years, there is very little doubt that the plant (if built for 6 mgd) would be at capacity the day it went on line leaving no reserve capacity. The FWPCA requires that EPA fund projects to meet existing needs with provision for reserve capacity, and the land use measures taken by EPA with regard to controlling the direction of future growth in the Design Service Area is intended to assure an environmentally sound utilization of such capacity (See Section VI, "Conclusions and Recommendations" and Appendix A).

Moreover, at this point in time, any redesign of the entire system to handle only existing needs would most likely result in abandoning the project since substantial costs and delays would result. Due to inflation, the capital costs of constructing a smaller plant at a later date would far outweigh the cost of building on 8 mgd plant now. Since a fewer number of contributors would be participating in the treatment system, it is conceivable that user charges (assessments, annual rentals) would be higher for a 6 mgd facility as compared to costs associated with an 8 mgd facility.

In addition, the hopes of servicing in the near future existing developments and industrial and institutional sectors currently operating malfunctioning package treatment plants or built in areas not suitable for septic tank operation is further justification for the 8 mgd facility. This point is discussed in more detail in Section III.D, "Population Projections".

5. Two Plants-Valley Creek - This alternative incorporates the use of 2 treatment facilities: a 2 mgd plant at the Valley Forge site and a 5.53 mgd plant on Valley Creek.

The 2 mgd plant would require only the degree of treatment currently designed for the proposed action. However, the plant on Valley Creek, if discharging the effluent to the creek, would require a considerably higher degree of treatment to meet water quality standards. Although this alternative would have the advantage of eliminating the force main and high lift pumping station to the Plant, there would be many disadvantages:

(a) With two plants in operation, the services of two sets of highly qualified treatment plant operators would be required.

(b) Areas northeast of the Valley Creek plant that might require service in the future would necessitate the construction of a pumping station and force main to carry the wastewaters to the plant, which would result in substantial costs at a later date.

(c) Although the probability of the Valley Creek plant failing and discharging raw sewage to the creek is no more than that of any other facility, its consequences would be much greater. The effect of raw sewage being dumped into Valley Creek, even for the shortest period of time, would have a devastating impact on the aquatic biota whereas the effect of raw sewage being dumped into the Schuylkill River as a result of a plant failure would be less damaging due to the greater assimilative capacity of the river.

(d) If spray irrigation were adopted as the method of effluent disposal, a cost savings would be realized by the elimination of the force main and pumping station to Valley Forge, but additional costs would be attributed to the cost of the land and for the facilities to accomplish spray irrigation. As indicated earlier, only the need for secondary treatment is recognized.

The area recognized as being the most potentially useful location for a spray irrigation site would naturally be in the vicinity of the plant. Although the Great Valley, underlain by a limestone belt should not be dismissed as a potential site since its soils (according to the Chester County Soil Survey Report) are deep but variable and well drained, the potential for polluting the groundwater supply is great. The natural action of water, air or decaying vegetative matter on these formations frequently leads to sinkholes and caverns. With the additional water by spray irrigation, it is likely to cause accelerated sinkhole development and surface collapse. Without the presence of a uniform deep soil cover, the possibilities of contaminating the groundwater becomes great. Due to the characteristics of the earth materials in this area, it is strongly recommended that before any spray irrigation scheme is adopted, careful exploration and detailed evaluations be made and no spray irrigation take place in this area unless the studies show it can be done safely.

Implementation of this multiple facility scheme would result in estimated annual costs of $923,500 for surface disposal of the effluent and sludge disposal via incineration. If sludge disposal is handled by a landfilling process, the annual costs would be reduced to roughly $879,500.

On the other hand, if spray irrigation facilities were constructed and operated as the means for effluent disposal, annual costs would approach $2,200,100; landfilling the sludge would reduce the figure to around $2,155,100.

6. Two Plants-Crum Creek - This second two plant alternative would locate a 5.43 mgd plant at the proposed Valley Forge site to handle wastes from the sub-basins of the Schuylkill River and a 2.10 mgd plant on Crum Creek to handle the wastes south of the ridge line.

Although the 5.43 mgd plant would require only the degree of treatment currently designed for the proposed facility, the second plant on Crum Creek, if discharging the effluent to the creek, would require a considerably higher degree of treatment to meet water quality standards.

Although this alternative does have the advantage of eliminating the piping and pumping stations originally necessary to convey sewage over the ridge to the Valley Creek Watershed, its disadvantages are very similar to those identified in alternative 5 even though the degree of impact would vary based on the different sizes of the plants. Of course, this does not mean that the adverse or beneficial impacts resulting from the schemes have been discussed in total. It is felt that the overall impacts resulting from any scheme to service the Study Area will be practically the same for each case especially in regard to secondary effects (see the conclusion of this section and Part III of this section, "Evaluation of Alternative Land Use Patterns"). Consequently, the economic comparisons of these alternatives become the critical factor in choosing the best one.

Because of the expenses of (1) redesigning Willistown's system to utilize a plant on Crum Creek, (2) designing and building such a plant and the trunk lines to reach it, (3) additional land acquisition and (4) participating in the construction and use of the Valley Creek or Valley Forge plant for those areas of Willistown in the Valley Creek drainage basin, it is believed that a separate plant on Crum Creek would be at least as expensive for Willistown Township as the proposed action. In addition, the operating costs of such a separate plant would be higher per gallon (and therefore per property owner) because of the lower volumes handled. In addition to the reasons cited above, a letter dated April 29, 1970 from the Pennsylvania Department of Health (now DER) to the Willistown Township Board of Supervisors stated that in order to protect the Philadelphia Suburban Water Company impoundment down stream, the Department strongly discouraged sewage treatment plants on Crum Creek.

If spray irrigation were to be adopted as the method of effluent disposal, cost savings would be realized by elimination of piping and pumping stations to convey sewage over the ridge. Also, the need to only provide secondary treatment is recognized.

As in the case of Charlestown Township, there do exist areas potentially suitable for a spray irrigation system. Comparing maps supplied in the EIS shows several of these potential areas as being built up or sparsely populated. The large tracts of land necessary to accomodate a spray irrigation system would in all probability displace some homeowners but this is only a preliminary indication. From the Chester County Soil Survey Report, the areas found to be potentially suitable were interlaced with areas designated as being too shallow (soils), too wet and flood plain.

The potentially suitable areas in the Crum and Darby Creek drainage basins are characterized by moderately deep, usually well drained soils. However, variable conditions do exist because of the soils' nearness to bedrock. The Soil Survey reveals that the predominant member in this variable category is the Glenelg series, which occupies about 42% of the County. Although Maryland and Virginia rate these soils as highly suitable for septic tanks, in Chester County past results have shown unpredictable ratings due primarily to the soil's shallowness and the existence of clay deposits clogging the soil. Once again it is important that detailed studies be conducted to refine these variable conditions.

Implementation of this multiple facility plan would result in estimated annual costs of $953,600 for surface disposal of the effluent and sludge disposal via incineration. Use of a landfilling operation would reduce the annual costs to approximately $909,000.

Assuming the necessary quantity and quality of land exists for spray irrigation the annual costs for this alternative would approximate $1,670,000 depending on the method of sludge disposal.

7. Three Plants - Another alternative to the proposed project is a three treatment plant scheme: a 2.0 mgd plant at the proposed Valley Forge site; a 3.43 mgd plant in Valley Creek; and a 2.10 mgd plant on Crum Creek. Once again the flows from the service areas would be split, this time to take advantage of optimum gravity feed.

The anticipated impacts of implementing this scheme have been discussed in the previous alternatives. Again, the degree of impact will vary because of plant size, but the resulting effects will be comparable.

Using surface discharge the annual costs associated with the implementation of this alternative is estimated to be $1,171,500 (with incineration) and $1,127,500 (with landfilling). Using spray irrigation the annual costs are roughly $2,076,500 (with incineration) and $2,032,500 (with landfilling).

Table IV-2 presents a composite of the annual costs of all the alternatives discussed in this section.

* * * * * * * * *

As a result of the analysis of all the above alternatives, including environmental effects, costs and risks of each such alternative, as well as additional analyses throughout this EIS, this Agency believes that Alternative 2 - the proposed action with sludge landfilled - is the best course of action.

TABLE IV-2

ESTIMATED ANNUAL COSTS* OF ALTERNATIVE SCHEMES

	SURFACE WATER DISCHARGE (INCINERATION)	SURFACE WATER DISCHARGE (LANDFILL)	SPRAY IRRIGATION (INCINERATION)	SPRAY IRRIGATION (LANDFILL)
Scheme I Alt. 1, 2 and 3	$623,400	$579,400	$1,742,500	$1,700.000
Scheme II Alt. 5	$923,500	$879,500	$2,200,100	$2,155,100
Scheme III Alt. 6	$953,600	$909,000	$1,686,800	$1,642,800
Scheme IV Alt. 7	$1,171,500	$1,127,500	$2,076,500	$2,032,500

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* Includes amortization (based on receiving a 75% EPA grant on 90% of the project cost) plus annual expenses.

PART III - Evaluation of Alternative Land Use Patterns

In the last decade, there has been a growing recognition that the impact of technological man and his use of the nation's air, water and land, especially in urban areas, has degraded environmental quality and the quality of the nation's life. In response to public recognition, Congress passed the Clean Air Act in 1970, and FWPCA in 1972. These acts mandate in quantitative terms, through Federal ambient air and water quality standards, maximum levels of emissions and effluents that are within built-in safety factors to protect the public's health. These standards, by law, are the measure of environmental degradation that may not be exceeded.

Technology can mitigate many of the observed and potential air and water pollution problems within the Study Area, but it is only through adequate planning and land management in the patterns of development and the related social and economic issues that the long-term solutions can be found.

As pointed out in the Introduction to this EIS, EPA is directed by the Council on Environmental Quality to examine the relationship of proposed wastewater treatment facilities, "to land use plans, policies and controls of the affected area" and to "assess the possible changes in population patterns and growth upon the resource base, including land use, water, air and public services of the area involved." While these secondary effects of development are discussed below, it must be recognized that EPA does not have the direct authority to limit land development or dictate the type of land development; that responsibility is traditionally that of local governments and their constituent residents.

A. Definition of Alternative Futures

In Section II.C, "Man Made Environment", it was noted that th surface and sub-surface waters have been degraded within the Study Area, particularly in Little Valley Creek, and that at the projected rate of growth, Federal primary air quality standards based on projected hydrocarbon emissions in Chester County from mobile and stationary sources will not be met by 1979 or 1985. (See Section II.C. 3, "Air Quality"). In addition, the Study Area has been included a a proposed Air Quality Maintenance area for SO_x and particulates, well as hydrocarbons (See Section V.C.5, "Impacts on Air Quality' Alternative development futures discussed below are designed to address both environmental issues - air and water quality.

The following alternative "futures" are briefly described below and evaluated in the following paragraphs:

B. No Action

This development pattern continues to rely on on-lot sewage disposal facilities and increasing number of package sewage disposal plants. Development would generally follow existing local plans and zoning ordinances except for changes in zoning or high-density residential development granted by municipalities or by the courts as is the case now. The land development pattern, relying for the most part on automobile accessibility, would increase vehicular miles travelled (VMT) and cause further degradation of air quality. Without proper sewage treatment, water quality would continue to be degraded and pose an increasing danger to public health. The demographic and economic projections would be those which DVRPC presented in Section III, "Distributions and Projections of Population and Economic Activities".

There are approximately 10,600 homes in the Design Service Area, of which up to 3,800 are experiencing malfunctioning on-site sewage disposal systems. If lot sizes are sufficiently large, it may be possible to replace these systems. However, if the sub-surface disposal systems are failing due to physical conditions such as high groundwater table, shallow bedrock depth, non-porous soils, etc., then replacement of the systems will not alleviate the problems. Once again, reference is made to the statement provided by the Chester County Health Department on the eventual failure of septic tanks that presently function properly. See Section I.D and Appendix 2 Exhibit 4. Homes experiencing malfunctioning on-lot systems certainly are less desirable to live in and real estate values for homes in the communities where this occurs depreciate. If building continued with the possibility of additional malfunctioning systems being constructed, the state would impose severe building restrictions on these communities as it already has done in some areas. Such bans with existing housing vacancy rates could generate substantial hardship to low- and middle-income families looking for new homes.

FWPCA provides that private organizations which meet the legal requirements for discharges to streams as well as water quality planning requirements of the state are entitled to NPDES discharge permits and, under this alternative, land developers could provide privately owned and operated wastewater systems for their developments.*

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*If private sewage treatment plants (STP's) are added to the list of "new sources" under FWPCA 306(b)(1)(A), as is being considered, EPA's issuance of the NPDES permit will be subject to a NEPA review under FWPCA § 511(c). In addition, on September 4, 1974, EPA, Region III, issued a distinct NPDES review policy for interim STP's to assure quality STP's.

In defining the alternatives, it is recognized that the Study Area lies directly in the path of metropolitan growth and expansion. Growth projections support this contention. Moreover, the area has generally favorable topography and soils for development and extraordinary levels of accessibility via planned extensions of transit service and planned and recently completed freeway construction. Since the lack of sanitary sewers has been an inhibiting factor on continued growth, the provision of these key facilities could lead to "uncontrolled", "run-a-way" and "unplanned" development feared by citizens and officials alike, voiced at the public hearings held on the Draft EIS and the subject of many comments on the Draft EIS.

However, it must be recognized that the Initial Service Area to be sewered by this project constitutes the existing health hazard areas only. While reserve capacity is built into the wastewater conveyance design to serve that portion of the unbuilt land areas within the Study Area designated as the Design Service Area, the development of a comprehensive land use planning and land management system will assure planned growth and protection of the basic environmental quality of the Study Area in these and all other remaining unbuilt land areas. The task involved relates primarily to the employment of the sewage collection system, its location, orderly and phased extension and capacity related to a planned and orderly future development. In addition, local ordinances are required to insure that environmentally sensitive areas are protected as controlled development proceeds. These tasks should not be confused with either the capacity or engineering alternatives (discussed in the prior section of the EIS) related to the Plant, since its capacity is based on present needs with a reasonable expansion for anticipated growth. The great danger of providing insufficient capacity is that when capacity is exhausted, two things occur: first, the municipalities within the Study Area will lose the control inherent in determining when and where sewer service will be provided (thus jeopardizing orderly growth and planned development); and second, development will revert to present practices including on-lot sewage disposal and indiscriminate use of package plants - the forerunners of future water pollution.

With regard to development within the Study Area, EPA's role is an advocate for the environment backed by legislative mandates. It is up to the municipalities to accept the responsibility for controlling growth. EPA, in cooperation with DER has pointed out to the local governments some of the ways in which local actions can insure maintenance of environmental quality and the orderly development of the Study Area. This subject is discussed in detail in Section VI, "Conclusions and Recommendations".

Municipalities, on the other hand, are usually dependent on substantial governmental aid for wastewater treatment facilities and often must conform to regionalization to receive funds. This pattern could lead to a multiplicity of small package wastewater treatment plants scattered throughout the area operated by several different organizations, often without sufficient supervision. Capital costs of such facilities would be passed on and included in the purchase price of the homes and establishments they served. According to VFSA's consulting engineers, "a very broad estimate indicates that the cost of a new home would include approximately $2,200 for sewers and treatment facilities while a sub-surface facility (on-lot) for the same home would require about $750. Replacement costs for a tile field or seepage bed would probably be around $400."

Finally, in the No Action "future" certain serious health hazards would not be corrected. There have already been several cases of hepatitis within the Design Service Area. It is also known that wastewater from hospitals is discharged without pretreatment of pathogens and contaminates surface and sub-surface water, thus, seriously threatening public health.

C. Existing Planning and Zoning with Sewer Service.

In order to evaluate this alternative "future" for the Study Area, it is necessary to understand why suburban development has moved consistently towards lower densities (larger and larger lots) and the problems related to sewering these densities cost-effectively.

As noted earlier, after World War II new single family housing was built at densities of more than four units to the acre. Domestic sewage was handled by on-lot sewage disposal for each house at this density. These and lower densities did not work, nor did the system work when percolation tests were made of the absorptive capacity of the soils where development occurred. Most municipalities, unable to solve the problem with sewer service, moved toward larger and larger lots. This solution has not worked either. In April, 1973, the Supervising Sanitarian of the Chester County Health Department stated, "Sub-surface sewage disposal systems are only temporary. In years to come, many sewage systems which now function properly will malfunction. This Department supports development of municipal sewage collection systems as the best means to prevent nuisances and health hazards." (See Appendix 2 Exhibit 4.)

Unfortunately, two and one-half decades of experimenting with on-lot disposal of wastes has left large areas of low-density residential development which is not cost-effective to sewer and a land use pattern that is costly to sewer. Letters in Appendix 2 Exhibit 2, bring out these points.

In Willistown Township, the Municipal Authority found that the extension of the proposed sewage collection system south of the Devon Road-Paoli Pike boundary directed by the Chester County Health Department was very costly to the home owners.

In Easttown Township, the consulting engineer of the Municipal Authority stated that certain areas in Easttown, south of Sugartown Road, were rejected for sewering because the cost of the sewage system for the area and the cost of pumping back into the Valley Forge System were excessive and a lack of sufficient density made the area not economically feasible to sewer.

These comments yield three criteria that should be employed in evaluating the future development pattern which will be produced under existing municipal plans and zoning ordinances:

> First, to sewer large lot, low-density residential development of one acre or more, capital costs become excessive and annual sewer rentals for the service area (low-density and other residential properties) become exorbitant.
>
> Second, scattered development, including industry and commercial as well as residential, results in "large runs of non-assessable pipes" and can result in the same high costs to everyone in the service area. The ordered or phased extension of sewer service is necessary to keep costs down or, for that matter, in some instances to make the system work.
>
> Third, if natural sub-drainage basins are not used as the limits of land uses requiring sewer service, force mains are required that increase capital costs and annual costs to the user.

In short, the provision of sewer service to the Study Area raises issues directly relating the future development pattern to both future costs of the service and the fact that unless an area is scheduled for sewer service the future development can recreate the health hazards that the project is designed to correct. Moreover, greater public control is required to minimize scattered development. Future areas to be sewered, to be more cost-effective and reduce future costs of service, should be at higher densities, especially residential areas that no longer need large land areas to absorb wastes on-site. Conversely, if sewer service is not proposed, the land areas and soils so designated must have the capability of absorbing wastewater and sufficient land provided within the lot to insure that if the on-lot system malfunctions, the system can be rehabilitated or another built. Lots of two to five acres or more on suitable soils would assure this capability.

Similar criteria to evaluate local plans should be considered to maintain air quality within the Study Area. Since the principal source of hydrocarbons are mobile emissions, the land patterns should be designed to reduce VMT. Two criteria are involved: the length of a trip to satisfy a trip purpose and the number of trips satisfied by auto as opposed to transit (rail or bus). The pattern of development controls the number of trips, the time of day the trips occur, the direction, the trip length and the mode of travel used.

Using the Composite Land Use Plans, Plate 19, prepared by VFSA's consulting engineers, and applying these criteria and other points rasied in this EIS, certain inconsistencies appear:

1. Some of the land areas within the Design Service Area, especially in Tredyffrin Township, are designated "Rural Residential (2 acres or over)." Unless densities are reduced, the cost per dwelling unit of sewer service will be very high affecting capital costs in these areas and increasing sewer rentals for the remainder of the Township.

2. "Low-Density, 30,000 to 70,000 sq. ft." residential zoned areas are in evidence in many townships and occur on land still not developed within the Initial and Design Service Areas.

3. Of greater concern is the appearance of "Low-Density" zoning for areas not scheduled for sewer service in 1985 and industrially zoned land in East Pikeland and Schuylkill Townships located on soils that have been identified as unsuitable for on-lot sewage disposal.

4. Zoned areas do not conform with major and minor sub-drainage basins and in certain cases "spill over" into the next basin either committing the next basin to sewer service or costly pumping and force main construction.

5. Large wastewater generators are located in the upper reaches of the Study Area, possibly necessitating conveyance of large volumes of wastewater almost the entire length of the Study Area to the Plant.

6. Most critical is the limestone formation in the Chester Valley. Here, industrial use is proposed across the Valley in East Whiteland Township. This zoning crosses the Valley and Little Valley Creek drainage basins and will commit each small drainage basin across the Valley to sewer service as it has already committed the northern sub-drainage area by the Main Line Industrial Park. Moreover, if all this land were developed

in a manner similar to previous industrial development, trips generated by workers and trucks would result in a violation of Federal ambient air quality standards.

In general, the higher density development proposed in the composite plans is located on those soils designated as requiring sewer service and is included within the Initial Service Area to be sewered. But there are also areas planned for high-density development, including residential, industrial and commercial, outside the Initial Service Area that should not be permitted until sewer service can be extended. Especially over the limestone formation, the provision of sewer service should be a requirement before construction is permitted.

D. Environmentally Sensitive Plan With Sewers

To maintain air quality within the Study Area, transit must be given a dominant role in determining the location of high-density residential, commercial and institutional uses that generate large trip volumes.

Auto dominant suburban sprawl has created in the Study Area and immediately adjacent areas (Exton and King of Prussia) so-called "auto dominant industrial parks", regional shopping centers and high, medium and low-rise apartment, condominium and townhouse developments that have been located without regard for transit service. This pattern of development totally dependent on the automobile, has generated extraordinary VMT within the Study Area and threatens to violate primary air quality standards for hydrocarbons in the early 1980's. (See Sections II.C.3, "Air Quality" and V.C.5.a, "Impacts on Air Quality" for further discusson on hydrocarbon problems). Since land use patterns are vulnerable to shortages of gasoline, if extended gas shortages occurred, the inability of shoppers to reach the regional centers, of workers to reach places of employment, and of the residents to reach these essential opportunities, could wreak hardship on the individual households and economic catastrophe for the developers and owners of these enterprises.

Accordingly, consideration should be given to providing high-density land uses in the station areas served by the two rail corridors in the Study Area. While SEPTA proposes this service, it should be expedited and coordinated with such development. On the

Penn Central, opportunities exist at all stations (Devon, Berwyn, Daylesford, Paoli, Malvern and Frazier); on the Reading, there are opportunities in Phoenixville and possibly a new station to be located in Schuylkill Township. The station at Valley Forge obviously must be reserved for visitors to the Park and a minimum number of commuters.

At each station in either corridor there is a service area of a 1/2 mile radius (a reasonable walking distance) within which such intensive residential or employment development could be encouraged. Residential densities could average 10 households per acre and permit, in key locations, densities approaching 25 dwelling units per acre. This latter density was proposed in neighboring Radnor Township. If such high-densities are permitted, a developer should be willing to pay up to $75,000 per acre (based on the developer's rule of thumb: 25 units per acre x $3,000/unit permitted) provided sewer service was available. Local municipalities, therefore, have the opportunity through zoning and the provision of sewer service to make the area available for urban renewal and redevelopment through the private sector. Pursuit of this land policy would accomplish certain goals:

1. Spread the costs of providing sewer service over many more households thus reducing the annual sewer rentals to present residents in the Study Area.

2. Create a substantial tax base. Studies in Tredyffrin Township's Comprehensive Plan, June 1970, indicate that apartment development yields more tax revenue after service costs are deducted per acre than even industrial development.

3. Provide an opportunity within the station service area of eliminating one of the major blighting influences in the communities, i.e., road town developments that have been spawned along several major highways in the area.

4. Increase the patronage on the commuter railroads and support feeder bus service without massive public subsidies now required.

5. Divert travel to the rail and feeder bus services to assist in the maintenance of clean air.

6. Finally, the provision of planned areas for multiple family housing, office buildings and intensive industrial development within the service area of transit will reduce the demands for such development in areas which are totally dependent on autos for access and require, in many instances, costly extensions of sewer service. Equally important, such a local land use policy will provide the best defense in court against builders who wish to buy "cheap" land removed from public services and have been denied permits to build package STP's to treat their wastes in remote areas.

Other public policies affecting development in the Study Area that are designed to improve and maintain air quality should be considered, such as:

1. VMT and thus mobile sources of air pollution, can be substantially reduced by adopting a development policy that leads to a balance between employed and resident labor force. At present, workers in the middle income group are commuting inordinate distances to places of employment in the Study Area simply because there is insufficient housing available to them within their means in the Study Area. This vehicular travel not only congests existing highways but provides the prime justification for more and more freeway construction and highway improvements within the Study Area. Residents turn out in mass to oppose such highway construction and they can directly attack the source of the problem by advocating a balance between employed and resident labor force.

2. Within this context, DVRPC's Regional Housing Allocation Plan 1970 - 2000 discussed earlier in this EIS takes on added significance. While DVRPC's allocation has not been distributed to sub-regions within Chester County at this date, its requirements should be viewed as underpinning one aspect of maintaining clean air in the County.

3. Serious consideration should be given to any pending development or existing zoning that would result in a land use which generates a substantial amount of vehicular traffic. Such land uses are called "indirect sources" by EPA and, by inducing large amounts of vehicular traffic, can create "hot spots" in air quality. Regulations have been promulgated by EPA and will take effect January 1, 1975. (39 Federal Register 25291 (July 9, 1974); see also 39 Federal Register 7270 (February 25, 1974)). The proposed commercial development in Chesterbrook (1,500,000 square feet of proposed office space), Westgate (850,000 square feet of proposed office space), as well as any other large zoned industrial and commercial areas in East Whiteland and Tredyffrin Townships, would be subject to these controls based on the necessity of maintaining air quality in the Study Area. See Section V.C.3, "Impacts on Air Quality" for a further discussion of indirect source review.

4. In the context of maintaining clean air, open space takes on renewed significance for it is the trees and other natural vegetative cover that regenerates good air quality. Such open space, either owned out-right by the public in the form of parks and sites for public buildings or low-density residential areas and agricultural conservation areas, performs this essential natural process.

Coupled with this land policy, open land that is located in small drainage basins sewered in the Initial Service Area should be encouraged to develop or be reserved as public open space. This is similar to Alternative "Future" B. The fact that sewer service to these properties could triple or quadruple their land value justifies increased taxes on this land to hasten its sale for development. Thus, the sewer service can be made more cost-effective for the community as a whole and reduce the user costs to individual households within the service area.

Of basic importance to the preservation of the natural environment and to the maintenance of its historic past within the Study Area are two central issues: First, the Chester Valley and, second, the green agricultural wedge consisting of the southern half of Schuylkill Township, almost all of Charlestown Township, the southern half of East Pikeland, West Pikeland and West Vincent Townships.

The Chester Valley, or at times referred to out of respect for its contribution to the region's past as the Great Valley, is underlain by a giant limestone formation. This area will require sewer service for all present and future dense urban development. No further high-density residential, commercial, institutional or industrial development should be permitted without "hooking-up" to the regional sewer system. The dangers of any other development policy being pursued by East Whiteland or Tredyffrin Townships have been pointed out in other portions of this statement.

Today, portions of the Valley within the Study Area have been committed to urbanization. The drainage basin of Little Valley Creek has been totally committed. The Initial Service Area provides mute evidence to this fact. Moreover, sewering this drainage basin and the sub-basins to the south that include the densely urbanized areas of the Main Line and heavy industrial areas is essential to correct existing septic conditions. In addition, the wisdom of picking up existing dense development in the upper reaches of Valley Creek in East Whiteland Township and, by force main, pumping waste water to Little Valley Creek is unquestioned.

Remaining questions deal with those portions of Chester Valley in Valley Creek not included in the Initial Service Area.

In East Whiteland Township, existing development constitutes a serious problem and requires the extension of sewer service in the reasonably near future. This serious problem is the location of the Main Line Industrial Park and its continued growth and expansion, and the Warner quarries at Devault. As shown in the Subdrainage Plate, these activities are in the headwaters of a small tributary to Valley Creek along the north side of the Chester Valley. To the west, within several hundred yards from the ridge line of the basin, the Malvern Trailer Court with 110 families and an ineffective package plant is polluting the upper reaches of Valley Creek. National Liberty Insurance Company and its associated residential development, The Great Valley Regional High School, the road town development along Route 30 now being joined by townhouses, puts the stamp of "committed to urban development" on the entire area. Thus, there seems to be no alternative to providing sewer service to the Study Area within East Whiteland Township.

Tredyffrin Township presents a substantially different picture in terms of options still open to preserve portions of the Chester Valley within its boundaries. First, the area north of the Pennsylvania Turnpike is still uncommitted to development. For the most part, this area falls on steeply sloping land, Mount Misery, adjacent to Valley Forge Park and held for the most part in "gentlemen farms." Low-density residential zoning and denial of sewer service could protect this land and buffer the park from future dense urban development.

As shown on Plate B, "Land Not Developed", the land area between Valley Creek and the Turnpike is mostly undeveloped or part of the proposed Chesterbrook Development. How much of this presently "open" land should be retained is purely a local issue, but the answer to this question provides the basis for the design of sewers to serve Valley Creek.

The other large area requiring sewers because of soil conditions lies along the Reading Railroad/Schuylkill Corridor. This area is shown in Plate A. The Initial Service Area conforms with this soil designation. Plate 2 indicates the land in this portion of the Study Area that is already committed to urban development and has experienced extensive malfunctions of on-lot sewage disposal facilities. The Initial Service Area provides sewer service for the central portions of East Pikeland Township including Kimberton and Kimberton Farms. The Design Service Area, to meet the 1985 demands, does not provide additional service beyond this point. It should be noted that with regard to any development in the French Creek Basin in East and West Vincent Townships, in the areas where sewer service is required due to severe adverse soil conditions, great care should be exercised that development is limited to very low-density residential growth and that on-site sewage disposal facilities are designed to overcome the adverse soil characteristics.

Plate B, "Land Not Developed," shows the proposed sub-divisions that have been reviewed by the Chester County Planning Commission between 1969 and April, 1973. These sub-divisions were analyzed and discussed earlier in the EIS to examine development trends.

While field inspection of many of these proposed developments has indicated that there is very little actual activity at these sites (only a few sites had sample houses and many showed no construction whatsoever) probably due to the current unfavorable financing conditions for the housing industry, they do represent a threat of construction at high enough densities to warrant sewer service or package STP's. In particular, those developments outside the Study Area in the upper reaches of French and Pickering Creeks could adversely affect water quality in the Study Area.

It should be pointed out that under FWPCA, the participation of the Federal Government in grants to build collector sewers is primarily dependent on two things. First, the development to be served must have been substantially inhabited as of the date of the passage of the Act (October 18, 1972) and the facility must be cost-effective. It is, therefore, very unlikely that EPA could make any grant to provide sewer service for most of these proposed developments outside the Design Service Area since such development would not satisfy either of the above requirements.

The Green Agricultural Wedge is underlain by soils that, for the most part, are suitable for low-density on-lot sewage disposal as shown in Plate A, "Natural Features". The soils, in regard to agricultural land capabilities, also are designated as Class II and III which are suitable for regular cultivation as shown in Plate 6. These two factors, plus the fact that at present there is very little if any land committed to densities warranting sewer service, strongly indicate that the Green Wedge should be preserved and zoned as an agricultural conservation area or in very low-density averaging five to ten acres.

Arguments immediately arise that this type of zoning will be declared "exclusionary" by the courts. If, however, this action is taken by the Townships involved in concert with moves to increase land for multi-family housing in the principal rail and road corridor communities, the courts should sustain such planning determinations based on sound environmental considerations.

The population and economic activities projected for the Study Area within the concepts for Alternative "Future" C, permit the distribution and location of residential, commercial (including offices), institutional and industrial land uses based on the ability of the environment to sustain the development.

V. PROPOSED PROJECT

A. Description of the Proposed Wastewater Treatment Facility

1. Administrative Background

The initial proposed project, operating under a joint board with members representing Valley Forge Sewer Authority (VFSA), and the Tredyffrin, East Whiteland, Malvern, Willistown and Easttown Municipal Authorities will provide a sanitary sewerage collection system with attendant pumping stations, interceptors, force mains and a wastewater treatment plant (Plant) for the service of the cooperating authorities.

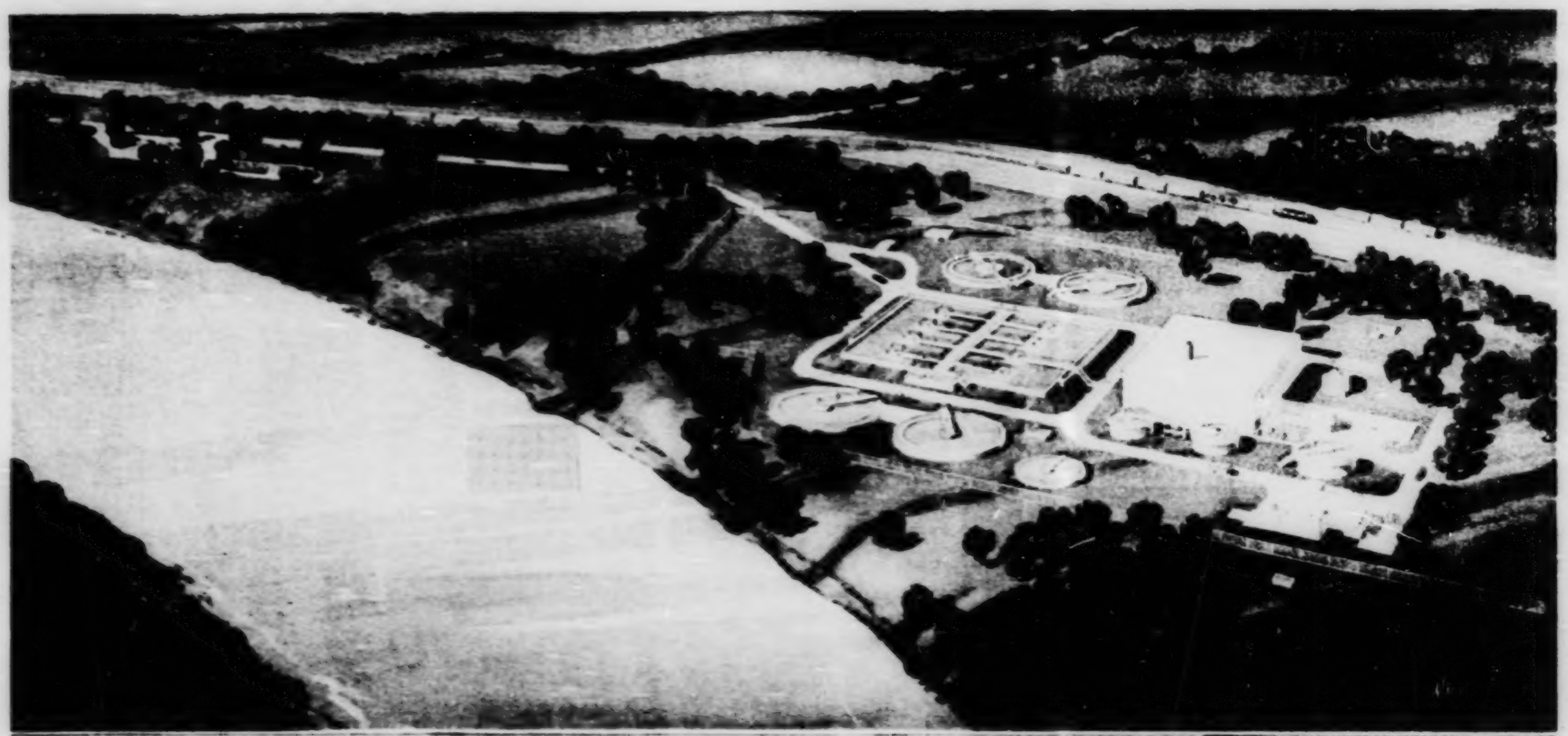
The VFSA, with the participation of the other authorities under the terms of an interauthority agreement signed November 1, 1970, plans to construct an 8 million gallon per day (mgd) Plant to serve the Design Service Area. VFSA's service area, which consists of portions of East Pikeland, Charlestown and Schuylkill Townships, contains approximately 4,000 acres. The participating authorities collective service area, including portions of East Whiteland, Tredyffrin, Willistown and Easttown Townships, and Malvern Borough, encompases approximately 18,700 acres. The Design Service Areas are shown in Figure III-2.

The Plant, which is to be located in Schuylkill Township in the vicinity of Perkiomen Junction will discharge to the Schuylkill River and has been designed for a nominal 8 mgd based on a design year of 1985. An artist's concept of the Plant appears on the following page.

VFSA plans to finance, own and operate the Plant in accordance with the provisions of the agreements signed on November 1, 1970 (Valley Forge Sewage Treatment Plant Agreement; Valley Creek Trunk Sewer Agreement; and East Whiteland Trunk Line Agreement), and to finance, own and operate its collection and transmission facilities in East Pikeland, Charlestown and Schuylkill Townships independent of the 1970 Agreements.

Tredyffrin plans to finance, own and operate the Valley Creek trunk line within the Township, the main pumping station and force main to the Plant in accordance with the provisions of the Valley Creek Trunk Sewer Agreement, and to provide sewage collection and transmission within the township independent of the agreement.

East Whiteland plans to finance, own and operate the jointly used trunk sewer line in that township in accordance with the foregoing agreement, and to provide sewage collection and transmission within the township independent of the agreement.



THE VALLEY FORGE SEWER AUTHORITY

REGIONAL WATER POLLUTION CONTROL FACILITY

The remaining townships plan to finance, own and operate their collection and transmission system independent of the agreements but are parties to agreements where they use facilities in downstream townships.

The administrative structure described and provided for in the abovementioned agreements results in each authority and municipality maintaining responsibility for its own system and paying for its share of capital and operating costs in townships where it uses facilities. The Sewage Treatment Plant Agreement also provides for the creation of a Joint Board which gives each participating township certain control over the construction and operational aspects of the Plant.

In addition to providing for representation from the participants, the agreements cover capacities requested by the municipalities, bases and methods of payments, distribution of state and Federal grants applicable to jointly used facilities, audit procedures, construction schedules, operating cost responsibilities, limitations on sewage quality and quantity, metering and flow estimating procedures to be used in establishing costs, provisions for expansion including procedures for renting unused capacity, insurance, arbitration and termination.

2. Allocation of Capacity

The 8 mgd design capacity of the Plant has been allocated among the constituent municipal authorities on the basis of the November 1, 1970 interauthority agreement, which prescribes the following influent allocations:

TABLE V-1

CAPACITY ALLOCATION FOR EACH MUNICIPALITY

Municipality	Capacity (mgd)	Equivalent Population
Valley Forge Authority	2.00	20,000
Tredyffrin Township	1.50	15,000
East Whiteland Township	1.60	16,000
Malvern Borough	0.53	5,300
Willistown Township	1.00	10,000
Easttown Township	0.90	9,000
TOTAL	7.53	75,300

The bases for these allocations are referred to in five letters written in 1970, and appear in full in Appendix 5 Exhibit 1.

Consideration has been given and design capabilities built into the entire system to provide for almost unlimited expansion of the initial system, both for the participating municipalities, as well as surrounding municipalities should they desire or need them.

3. Location

The Plant is to be situated on two tracts of land totalling approximately 24 acres in Schuylkill Township, on the west bank of the Schuylkill River at the confluence of Perkiomen Creek, a few hundred yards upstream of the Pawling Road Bridge leading to Montgomery County (Perkiomen Junction in terms of the Reading Railroad). There are very few residential homes within ½ mile of the proposed site and the land not acquired for the initial treatment plant installation is now being used as a brick-clay quarry operation by the owner, McAvoy Vitrified Brick Company.

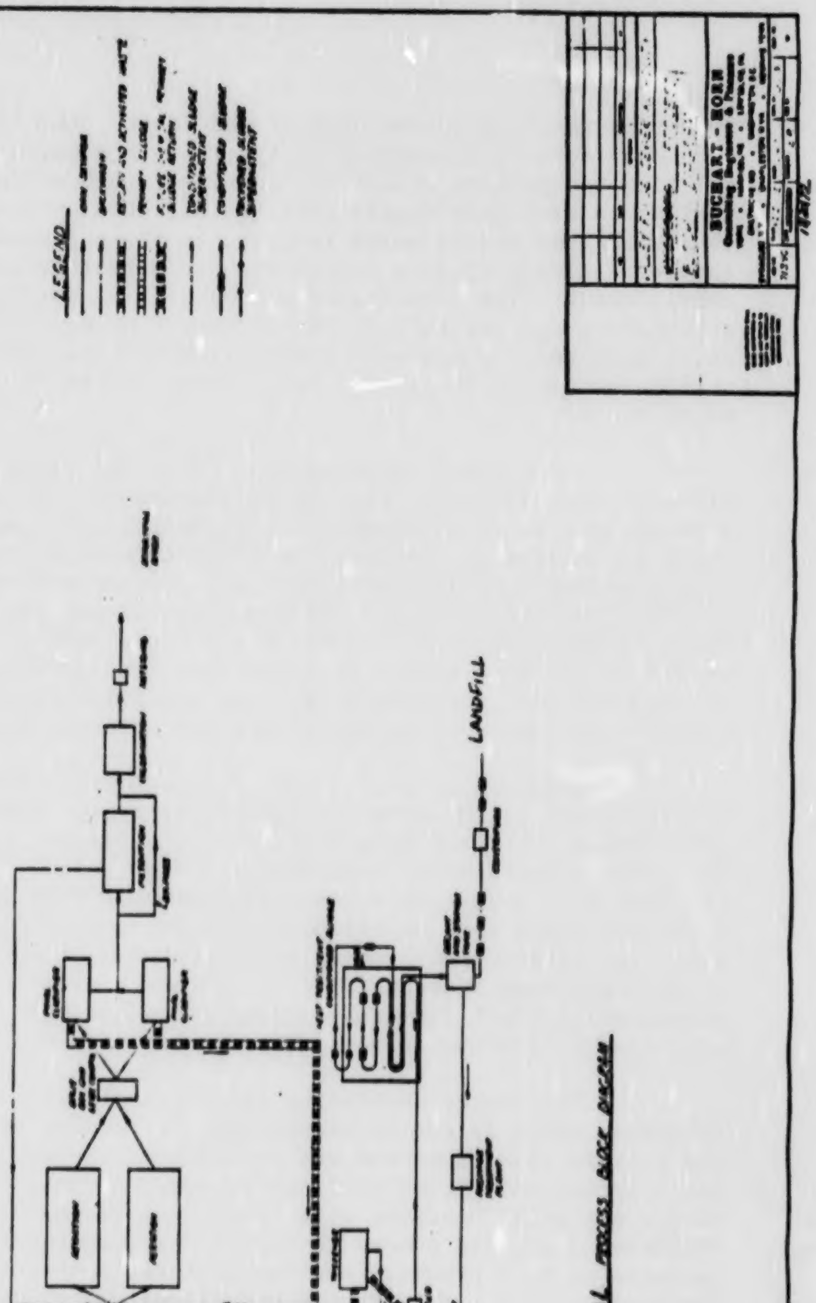
The acreage allotted to the Plant site provides the capacity for expansion up to 20 mgd with conventional treatment, and an adoption of space-saving wastewater treatment processes such as UNOX, being contemplated for other areas, could provide a maximum treatment capacity of 30 mgd. Immediately adjacent to the site is additional acreage which, if required, could probably be obtained. This could then provide a site which could sustain a treatment plant facility with the capacity of up to 60 mgd. Although this does not imply that the Plant will be expanded to such sizes, there is adequate adjacent land if the needs or requirements of the Study Area were to justify any expansion.

4. Treatment Process

The processes selected have been designed to accomplish 95% total BOD removal during the summer months and at least 85% during the remainder of the year based on a five consecutive day average of values. Suspended solids removal is specified at 10 milligrams per liter (mg/l). Post aeration of 5 mg/l dissolved oxygen is provided. Disinfection in accordance with the requirements of the DER permit will be accomplished with chlorine.

The Plant will include three grit removal units, two primary settling tanks, two aeration tanks, two final settling tanks, a chlorine contact tank, three chlorinators, two sludge dewatering centrifuges, six pressure sand filters and one post-aeration basin. A flow diagram of the proposed facilities and process is included as Figure V-1.

Excess primary sludge will be pumped from the primary settling tank and passed through a cyclone grit collector before being fed to two gravity thickeners for concentration as the super-


LEGEND
LANDFILL
BUCHART - HORN
Consulting Engineers & Planners
12/8/72

FINAL PROCESS BLOCK DIAGRAM

FIGURE V-1

natant is returned to the head of the Plant. The flow of the secondary activated sludge will return to the aeration tanks to mix with the primary clarifier (settling) tank effluents. Eventually the resulting sludge will be collected by bottom suction revolving arms and conveyed to pumps to the thickener. The total thickened sludge will be pumped through a heat exchanger for conditioning. The conditioned sludge will be settled with the supernatant and returned to the thickener by way of a small aeration plant. Subsequent sludge from settling will be pumped to the dewatering centrifuge for process before disposal of these solid wastes.

The process selected for use at the Plant is a completely mixed process. This is an improvement on the step aeration process as it provides for incremental addition of return activated sludge to the aeration tanks as well as raw wastewater. This provides a considerably more homogeneous mixture than step aeration and establishes a treatment equilibrium in the aeration tanks in which all the wastewater undergoes equal nutritional processes at the same time. To accomplish a satisfactory removal of nitrogenous BOD, additional aeration capability is provided to the aeration process used in satisfying the carbonaceous BOD.

After chlorination and reoxygenation, the effluent will be discharged to the Schuylkill River by a pipe near the western shore which existing data show to be the deepest point - the point of greatest turbulence, velocity, and flow volume. This discharge location will result in a good dispersion pattern downstream. Perkiomen Creek and the effluent from Montgomery County's Oaks Plant enter the river a few hundred yards upstream of the point of discharge at an angle such that the flow is carried toward the western bank, contributing heavily to the current along the bank. In addition to good mixing, maximum dilution is achieved with the river waters.

The sludge processing system consists of a gravity thickener which is the receiving tank for sludge removed from the primary clarifiers and waste-activated sludge from the biological system and filter backwash solids. At this point, the solids are still unstable with respect to biological action. The thickened sludge is pumped through a heat treatment unit which operates at high pressure and temperature, performing several functions. First, the process stabilizes the sludge, making it suitable for landfilling or spreading without the problem of septicity. Second, it conditions the sludge for easy dewatering for further processing. Heat treatment is backed up with a parallel chemical treatment step for dewatering. These chemicals will not stabilize the sludge. Next, the conditioned sludge will be mechanically dewatered by a centrifuge to bring the solids content to 30-40% prior to disposal. A relatively dry cake can be removed from the system at this point.

5. Sludge Disposal

At the time the Draft EIS was written, the proposed method of sludge disposal was incineration. Economic and environmental considerations have prompted EPA to encourage the applicants to investigate landfill/landspread operations as a means of sludge disposal. Although during the design of the proposed system when the only viable alternative was incineration, the applicants did investigate the possibility of utilizing landfill operations and at that time, there were no available sites for the disposal of the conditioned sludge. Since that time, however, the owners of the Knickerbocker Landfill have indicated their willingness to accept the conditioned sludge from the Plant. The landfill is located in East Whiteland Township off of Route 29 near the Great Valley exit on Route 202. It has a permit from DER to operate, and an asphalt membrane under the fill is designed to preclude contamination of the groundwater. The usable life of the fill is estimated to be approximately 10 to 15 years which would provide adequate capacity throughout the design life (1985) of the proposed treatment facility. Currently, the landfill owners have issued to VFSA a written "Statement of Intent" to accept the sludge and negotiations are underway with DER for the necessary permits to haul and dispose of the sludge in the manner described. As discussed previously in Section IV, "Alternatives", landfilling the sludge will result in a large annual cost savings as compared to incineration.

Continued efforts by the applicants in exploring other "future" alternatives for sludge disposal have been discussed, including studies to determine the possibility of spreading the sludge on cropland or pastureland at such time as the economic and environmental considerations become favorable.

6. Pipeline Locations - Valley Forge State Park

Wherever possible, the location of the proposed pipelines (which include force mains, interceptors and gravity collector sewers) has been in the right-of-way of state, township and borough streets and roads. Only where the geographical and physical aspects of the terrain have precluded any alternative course have pipelines been located in areas which transgress specific areas of the natural environment. At points where such a location is unavoidable, every effort has been made to locate the pipeline in such a way as to minimize the damage to be done to the natural state of the area during construction.* Where possible, areas have been selected for their rights-of-way which will avoid the removal of large trees in a forested area. The pipelines have been situated with respect to the natural environment and in a location in which the rehabilitation and recovery of the area disturbed during construction will be of a short duration, involving in most cases only reseeding and planting. Only in locations where alternatives were not available do pipelines traverse natural forested areas, and in these cases, the design and construction specifications comply in all respects with Federal and state statutes and regulations, as well as the project construction documents.

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*See e.g., discussion on Sharp's Wood at Page IV-10 and Appendix 4 Exhibit 4.

Portions of the proposed Valley Forge project do encroach on Valley Forge State Park. Extensive negotiations have been conducted with the Valley Forge State Park Commission over the past three years in order to satisfy the Park Commission's concerns. One major pumping station - identified by name as the "Wilson Road Pumping Station" - which was previously designed for location on Wilson Road relatively close to Lafayette's Headquarters has, at the request of the Park Commission, been redesigned and relocated at a point removed from Park property and on the south side of the Pennsylvania Turnpike. A more detailed discussion on the "Wilson Road Pumping Station" as well as the events leading to EPA's compliance with Section 106 of the National Historic Preservation Act of 1966 appears later in this section. No other major structure is contemplated at present to be located on Valley Forge State Park property.

As stated previously, serious consideration and time consuming studies have been devoted to the selection of the proposed pipeline locations which traverse both properties immediately adjacent to and within the Park area itself. Within the Park areas, wherever possible, the pipeline has followed the right-of-way of roads; where this was not possible, the right-of-way sites have been selected to traverse unforested areas of the Park, in locations as inconspicuous as possible and not readily discernible to the average Park visitor.

By far the most significant length of right-of-way which crosses Valley Forge State Park is the one required for the installation of a force main from the new location of the Wilson Road Pumping Station to the Schuylkill River. This proposed pipeline follows in general the route taken by Valley Creek as it flows to the River. A force main installation, such as this which utilizes the majority of the required right-of-way across Park property, has a definite aesthetic advantage over the normal gravity sewer type installation since the force main does not require the installation of unsightly manholes at periodic intervals of 300 to 400 feet. There will be only a few manhole-type installations (perhaps three or four) on the entire length of the pipeline. These structures will be flush with the existing ground, and their visible portion above ground will not differ from an ordinary manhole.

The areas of historical significance to the Park and all known potential sites of future historical excavation indicated by the Park Commission have been physically avoided. Should the proposed excavation uncover any site containing information of historical value at any time during construction, the construction contracts specify that work will be stopped immediately and all care and precautions taken to protect the site and provide the Park Commission with an opportunity to study and review said information.

The initial sewer system, including Plant site, pumping stations, interceptors, force mains and collector sewers can be viewed on Plate 3.

7. Pipelines

Pipelines for the entire sanitary sewage project are designed as separate sewers. In no location or instance are there any combined sewers in which water from roof drains, streets and groundwater from foundation drains and other areas is conveyed to the sewer system. No sewers are designed in any part of this project to carry both sanitary and storm sewage. Under normal design capacities, no overflows are designed or permitted within this system. In laterals and submain sewers, design criteria is set at 400 gallons per capita per day (gpcd). In main, trunk and outfall sewers, the design criteria is set at 250 gpcd. No sewer, no matter how small the service area, will be less than 8 inches in diameter in any part of this project.

All gravity sewer lines are designed to maintain a mean velocity when flowing full of not less than 2 feet per second. In places of high velocity such as steep slopes, special provision has been made to protect against displacement by erosion and shock. In areas where steep slopes (15% or greater) and high velocities are encountered, the pipeline is securely fastened with concrete anchors and cast-iron pipe used in the construction.

All sewers are designed to prevent damage from superimposed loads by selection of the proper strength of pipe based on the width and depth of the trench. In the case of vitrified clay pipe, only vitrified clay extra-strength pipe is specified regardless of the superimposed loads. In the case of cement asbestos*and concrete pipe, the strength of the pipe is again specified depending on the width and depth of the trench. Where possible, all manholes and possible entrances of surface run-off have been designed to avoid potential floodplain areas; however, where there is any doubt or some indication that the top of a manhole may be totally or partially submerged during a period of heavy surface run-off, waterproof manhole covers have been specified.

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* The specifications allow for cement asbestos pipe as well as other material. On August 14, 1974 EPA initiated a study to determine what effects, if any, asbestos material might have on water quality. Accordingly, this Agency has requested that the consulting engineers for VFSA evaluate the use of alternative pipe materials in light of EPA's study, and the consulting engineers have agreed to reexamine the question of pipe materials and the advisability of a change in the specifications.

The time is past when exfiltration in any significant quantities from sewage pipelines is considered acceptable. With the advent of new pipe materials, construction methods and sealing methods for pipe joints, the allowable and acceptable exfiltration rights have steadily decreased. Construction standards call for infiltration rates in the range of not greater than 200 gpd per mile of pipeline per inch normal diameter. Leakage tests on manholes are limited and shall not exceed 2 gpd per vertical foot of manhole when the water level is maintained at one foot above the high-ground water level.

8. Pumping Stations

The Valley Forge project contains 23 pumping stations located in the various drainage basins previously described in this EIS, of which 9 are located on major interceptor lines with above-ground structures. It is basically these nine stations to which the major portion of this discussion will be devoted.

The major pumping stations are designed to provide the necessary capacities through the design year of 1985. The capacity of these pumping stations may then be increased by a combination of enlarging the pump size and adding one or more pumps. The existing structures and internal piping are sized to provide for either of these additions.

a. Minor Pumping Stations

There are 14 minor pumping stations. They are located primarily in the collector system of the project, have relatively small flows and are basically below-ground structures with only the entrance hatches and ventilation ducts situated above-ground. Since they basically serve collector systems, all these below-ground structures are located in residential areas on privately-owned property, except for the Valley Creek Pumping Station which is located on Valley Forge State Park property. The Valley Creek station, located almost directly west of George Washington's Headquarters, is completely hidden from any of the historical buildings within the Park and is a below-ground structure with the access road entering from Pennsylvania Route 23. This access road is an existing service road and will only be up-graded to improve its present condition. The installation of this pumping station will, as presently designed, require no extensive regrading either for the access road or the pumping station and is situated so as not to disturb any of the forested area in the general vicinity of Washington's Headquarters.

These small pumping stations are all equipped with a stand-by generator to operate the equipment in periods of electrical shortage or outage. In addition to stand-by generators for complete independent operation, these stations are equipped with various alarm signals which will monitor wet-well elevation, pump failure, power failure and valve failure. These alarm signals are transmitted by telephone communication to the proper control center for each individual municipality responsible for maintenance and operation of the system. Also, should mechanical failure of the pump occur, each pumping station is equipped with the necessary stand-by pump or pumps required to develop the full design capacity of the station.

Where applicable, the small pumping stations are designed against known flood elevations and, where information is available, the existing flood elevations have been supplemented with the new information obtained during the flood of 1972.

b. Major Pumping Stations

For the purpose of this study, major pumping stations as defined are those of such a capacity as to require the installation of above-ground structures to house the equipment. As previously stated, there are nine such stations within the Valley Forge project area. A rendering of the architectural design of these above-ground structures is shown in Figures V-2 and V-3. The architectural style and design of these above-ground structures have been reviewed and approved by the Pennsylvania State Art Commission, the county planning agency and the local municipal planning agencies.

Wherever possible, site locations for the major pumping stations have been selected as far removed from local residential areas as possible and, where impossible (such as the Pot House Road Pumping Station in Schuylkill Township), extensive design has been incorporated into the proposed installation to reduce the resulting noise levels from equipment operation and any odors that might conceivably be present during operation.

Some of the design features incorporated to overcome these conditions are installation of the motor units below-ground to reduce noise levels, installation of mufflers on blowers and stand-by generators, construction of concrete and masonry structures which serve to deaden

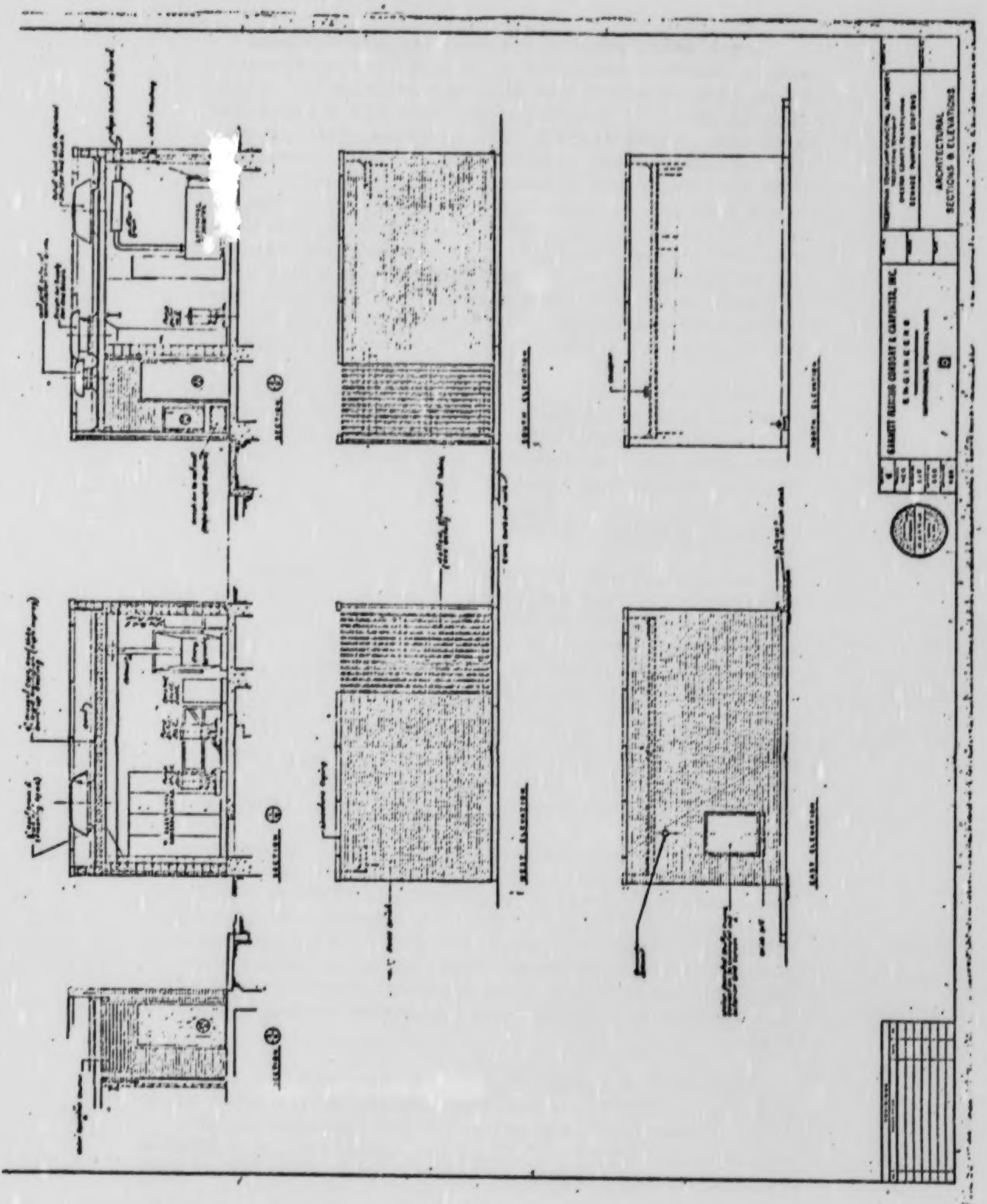
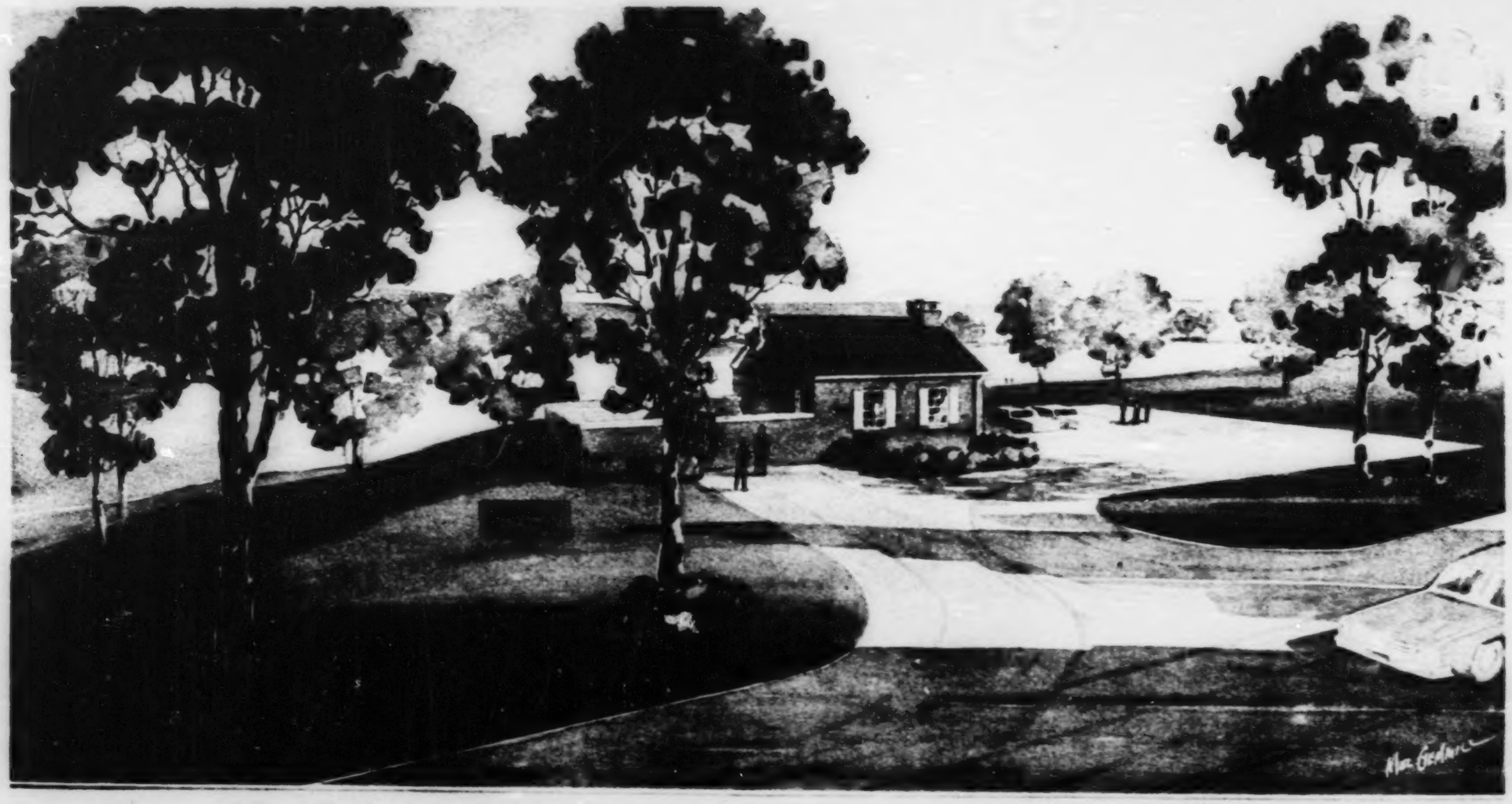

GANNETT FLEMING CORDDRY & CARPENTER, INC.
ENGINEERS
ARCHITECTURAL
SECTIONS & ELEVATIONS

FIGURE V-2



WHITE HORSE ROAD PUMP STATION

THE VALLEY FORGE SEWER AUTHORITY

sound, pretreating sewage in the wet-well with oxygen and using ozone in the wet-well sections to eliminate any odors which might be transmitted to the outside atmosphere by the exhaust system.

The main pumping stations are all equipped with a stand-by pump having a capacity capable of replacing the largest main pump should a malfunction occur. In addition, the entire pump control system consists of two complete and separate individual control systems alternated on a daily basis, with either system having the capacity to automatically replace the operative system should it fail while in operation. Also, the stand-by pump is operated periodically so that its working condition is always maintained at the same level as the base pumps. Dual wet-well level sending equipment for control of pumps is provided, as well as a dual duplex water-seal system with automatic changeover in case of malfunction to provide cooling water for packing and bearings on the pumps. An alarm system is provided to automatically signal any malfunction in the operation of the pumps, pump motors, power supply, control system or valves. This signal is automatically relayed by way of telephone communication to the appropriate maintenance headquarters responsible for the particular service area in which the pumping station is located.

Emergency stand-by power for the major pumping stations is provided by one of two methods. One is a stand-by generator with sufficient power to operate all of the essential equipment in the station; the other is a dual electrical service from two separate generating sources, with automatic switch gear and equipment as required to alternate to stand-by source should one generating source fail or experience a power shortage.

As an ultimate safeguard, the proposed system has included, as part of its equipment, the purchase of a maximum size diesel pump, trailer-mounted, that can be towed to any pumping station site should an unforeseen, unavoidable interruption of operation occur. This pump will be permanently stationed at one of the main pumping station sites, centrally located for service to the remaining stations. The pumping station design itself provides for the installation of the necessary by-pass piping, valving with access manholes so that this pump can be connected to the inflow wet-well piping and then, by way of the portable pump, pumped to a valve intake on the force main side of the station.

As in the case of the minor stations, the major pumping stations were all designed with the necessary projections against known flood elevations prior to the 1972 flood. However, a review of the 1972 flood elevations necessitated the redesign of the French Creek and Pickering Creek Pumping Stations. These have been designed to provide protection against the 1972 flood elevations which, in these areas, were greater than those previously recorded.

c. Valley Forge

None of the major pumping stations are located on Valley Forge State Park property or other presently designated historical sites. The Wilson Road Pumping Station was at one time planned and located within the Park area in the general vicinity of Lafayette's Headquarters between Wilson Road and Valley Creek. However, as requested by the Park Commission, that pumping station has been relocated south of the Pennsylvania Turnpike completely removed both physically and visually from the Park area. The sequence of events leading to the final location of the Wilson Road Pump Station are as follows:

During the planning and design stages of the proposed action, the Park Commission expressed concern relative to construction techniques and pipe alignment as they related to historical considerations and possible disruption of Park activities. The physical location of a major pumping station originally placed north of the Pennsylvania Turnpike immediately adjacent to the Park property had been a subject of concern and also the architectural considerations of the station had been questioned. Concern related to potential population growth in the Valley Creek Basin as influenced by sewage facilities had been subject to the Commission's questions, particularly with regard to uncontrolled development which, if permitted, could result in flooding of key Park facilities.

A request was made by the Pennsylvania State Liaison Officer for Historic Preservation and the President's Advisory Council on Historic Preservation that the municipal authorities reinvestigate the location of the Wilson Road Pumping Station and comply with certain construction requirements.

On October 19, 1972, VFSA transmitted a proposal to the state Assistant Attorney General, Alan L. Spielman, Esq., for the purpose of complying with the requests. At that time, potential alternate locations for the controversial pumping station were offered.

On June 25, 1973, the Park Commission adopted a resolution accepting the selection of a pumping station site located south of the Turnpike, conditioned upon the proposed action being found environmentally sound by EPA.

Since the project would affect Park property, EPA undertook procedures for the Park's protection by obtaining compliance with Section 106 of the National Historic Preservation Act of 1966, in the form of a "Memorandum of Agreement". Prior to the execution of such a Memorandum of Agreement, an agreement had to be reached between the Park Commission and VFSA. William J. Wewer, State Historic Preservation Office, was requested to intervene and assist in the negotiations. With his assistance, VFSA presented a proposal to the Park Commission outlining the measures and conditions that it would carry out and the manner in which sewage facilities would be constructed or located in or in the vicinity of the Park. The only unresolved matter relative to this proposal was the location of a pumping station originally proposed for installation in the vicinity of Wilson Road

Consequently, further design and alternative locations were evaluated. As a result, three alternative site locations were submitted to the Park Commission for its evaluation and choice. The June 25, 1973 resolution and conditions followed, which was approved and accepted by the State Historic Preservation Officer and EPA. A letter dated August 15, 1973, enclosing this adopted resolution as a proposal for a "Memorandum of Agreement", was submitted to the Advisory Council on Historic Preservation by EPA for its review.

Subsequently, the "Memorandum of Agreement" was prepared by the Advisory Council and signed by its Executive Secretary on May 20, 1974; by EPA's "Responsible Official" on May 23, 1974; by Mr. Wewer on June 4, 1974; and by the Chairman of the Council on June 24, 1974. This completed the Section 106 process. Copies of the entire package regarding this Section 106 compliance have been included in Appendix 5 Exhibit 2.

9. Industrial Waste

In accordance with the design of the Plant by the local consulting engineers, industrial flow (initial phase) into the Plant from industries within the Design Service Area will contribute only approximately 5% of the total flow to the Plant.

Pretreatment will be required of those industries which discharge industrial wastes. In order to contend with industrial and institutional wastes, Article V of the Treatment Plant Agreement provides rules and regulations regarding pretreatment.

Each community will have its own ordinances concerning the control of industrial waste and sewage quality which will be equal to or more stringent than those specified in the agreement. In addition, the NPDES permit issued by EPA will indirectly oversee the quality control of sewage flow from industries to the plant. A copy of Article V, as mentioned above, is included in Appendix 5 Exhibit 3.

Table III-8 lists the industries within the Study Area.

10. Financing Requirements

a. Initial Costs

The components of costs for a typical sewerage project would be as follows:

(1) Construction costs (payment for services of private construction contractors).

(2) Associated project costs:

- Engineering design and inspection services (during construction).
- Legal and fiscal costs.
- Construction contingency (to cover unforeseen conditions).
- Administrative costs (covering Authority expenses for offices, secretarial help and business machines).
- Preliminary operating expenses (to cover salaries power, chemicals, etc., during start-up when revenues are not yet flowing).
- Lands and rights-of-way (costs of acquiring pumping station sites, treatment plant sites and lands required to run pipe lines).
- Assessment expenses (costs associated with preparation of assessment program).
- Interest during construction (interest payments that must be made prior to receiving revenues).

- Bond discount (payment for services associated with the sale of bonds necessary to finance the project).

- Printing (costs associated with printing bonds).

The aggregate of the above costs are generally referred to as the "project cost", from which deductions are normally made for (1) Federal and state construction grants; (2) capital contributions from private or public bodies; and (3) interest earned on borrowed money to accomplish construction.

b. Raising the Municipalities Share of the Costs.

The project cost less deductions then become the amount of money the community must finance for construction either privately through banks or publicly through the sale of bonds. Because of its magnitude, the bonds for this project will be of two types:

(1) Assessment Bonds - These bonds, which are normally retired in five years, have a comparatively low interest rate, and are paid for by the monies collected from property owners based on front footage assessments. Thus, the greater the assessment, the lower the annual "debt service".

(2) Revenue Bonds - These bonds, which are outstanding for as long as 40 years, have an established rate of interest which reflects market conditions at the time of issuance and the credit index of the specific community.

The annual bond payments are referred to as "debt service". A safety factor of 10 to 20% is generally added to the debt service to insure sufficient revenues for payment.

c. Operational Costs

Operating costs are those continuing expenses necessary to pay the salaries of system operators and for electric power (see Appendix 5) and fuel, chemicals, maintenance, continuing services of professional advisors and similar items. The sum of the debt service plus the operating costs then become the annual sum a community must raise to pay for the system.

The annual rental is an allocation of the operational costs to the users in the rate structure. Communities using facilities in other townships (plant and trunk lines) pay their share of the construction costs by way of a capital contribution. This share, as described in this EIS and covered in the agreements, is based on the percentage capacity requested by and allocated to the specific community. The operating costs for each community consist of the cost of operating and maintaining its own system plus the cost of using its trunks and the Plant based on actual flow.

d. User Costs

The user (homeowner, industry or institution) pays its costs as follows:

(1) Assessment - either a lump sum or series of payments over a few years, depending on the provisions of local ordinances.

(2) Rental - paid in monthly, bimonthly or quarterly charges.

(3) House to lateral piping, which is contracted for with a private plumber who must follow local ordinances.

Since the preparation of the Draft EIS, cost estimates for the various projects associated with the proposed project have been updated to reflect current conditions plus an allowance for several additional months of cost escalation. In addition, applications have been made for funding collector sewers, which became eligible for funding after the submission of the applications for the project. A revised analysis of these costs as they might affect the user has been prepared and Table V-2 shows the estimated annual sewer rentals for each equivalent dwelling unit (EDU) for each participating municipality or authority.

It should be remembered that the principle of the intermunicipal agreements is that each participant maintains its own fiscal responsibility and shares the cost of joint facilities such as the Plant and major transmission facilities through East Whiteland and Tredyffrin Townships. The cost salary is based on a capital contribution to cover project costs and initial operating costs and is based on an annual cost related to the actual flow treated.

The table is developed in "cases" to show the effects of EPA's and DER's pending decisions on final grant amounts for each project. Since the projects, with the exception of Willistown, were submitted in two separate fiscal years and under two separate laws (P.L. 92-500 and 92-660), the final decision, of course, is also not forthcoming until the final decision on the overall project is reached.

Since the grant is the most substantial variable, it was decided to present the table in the format showing the variable effects.

Case I -

This case shows updated project costs for each participant; assumes that EPA will fund only the original applications, without any adjustments for increased estimates or actual construction costs.

For each participant (except Tredyffrin with a large base population), the annual cost to the homeowner would now exceed $200. The owner would also be responsible for paying an initial amount through a front footage assessment or tapping fee.

The term "short term bond issue" used in the calculations is this amount for the entire township. The value used in Case I is equal to the individual township's assessable footage times $12.50 per foot. This figure is variable for each township depending on that township's actual requirements. If this figure is increased, the revenue bond issue would decrease and lower the annual rental and vice-versa. A general rule of thumb is that one dollar of assessment equals $7.00 in annual rental. If the tapping fee alternative was selected, the total short-term amount would remain the same in this sample but the distribution to users would vary.

Case II -

This case shows the updated project costs; assumes that EPA will fund all applications submitted, as follows: only the original amounts for the first applications but the amounts requested for the subsequent applications covering collection systems under P.L. 92-500 (which were based on previous estimates of project costs).

Treatment of shared costs and the short-term bond issue is the same as for Case I.

Case III -

This case is presented as Case III a, b and c. Case III assumes that EPA will fund the project completely at 75% and that 90% of the project costs for each municipality will be eligible for grant participation.

In Case III-a, the short-term bond issue is the same as in Case I or based on a $12.50 per front foot assessment for all communities or its equivalent. Case III-b recognizes the possibility that with a 75% grant covering collection sewers it may not be possible to assess at the $12.50 since the assessment figure is related to the cost of the pipe in and along the property and if that cost is financed by the Government, the balance paid by the users would be smaller. The effect of reducing the short-term bond would be to increase the rental since the total monies to be financed by the users would not change. Case III-c represents an alternate if no short term issue was applied; again the effect is to increase the rental.

The figures assume that the estimates reflect actual costs. With today's economy, only the actual bid prices will enable more accurate figures to be developed. The number of users or EDU's is based on users anticipated initially. This figure varies with time because development of the area is taking place currently without sewers. Naturally, increases in the number of users would decrease the rentals.

TABLE V-2

ESTIMATED ANNUAL SEWER RENTALS

Municipality	CASE I	CASE II	CASE IIIa	CASE IIIb	CASE IIIc
Valley Forge (Schuylkill, Charlestown and E. Pikeland Twps.)	$228	$123	$ 99	$139	$190
Tredyffrin	$136	$102	$ 93	$ 99	$107
E. Whiteland	$276	$225	$143	$162	$185
Malvern	$190	$112	$ 99	$129	$166
Willistown	$254	$192	$128	$151	$180
Easttown	$333	$182	$ 95	$131	$190

The Draft EIS reflected user charges based on individual engineer's estimates made between 1971 and 1972. C. C. Collings and Company, Inc., VFSA's investment bankers, prepared a cost analysis for each municipality in order that the finances of the entire project might be readily available in one document. Appendix 5 Exhibit 4 of this EIS presents this information as it appeared in the Draft EIS for comparison purposes.

The cost analysis for the updated cost figures appearing in this section was prepared by Buchart-Horn, Inc., consulting engineers for VFSA, through information submitted to them by the individual municipalities engineers.

The computations used in arriving at the final estimated "user charges" figures in Table V-2 were submitted to C. C. Collings for verification before being accepted by EPA. In a letter dated May 31, 1974 from that company to EPA, it was stated that a review of the work done by Buchart-Horn was determined to be correct in methodology and that the final figures arrived at were computed correctly and sufficient for the purposes intended. This letter appears in Appendix 5 Exhibit 5 and should be read for further clarification.

B. Proposed Project's Consistency with Regional Planning

Section IV of this EIS, entitled "Alternatives", concluded that the best approach to alleviate public health problems and meet water pollution control needs for the area was to construct a sewage treatment facility at a location defined earlier in this section.

In light of the fact that there does not now exist any regional planning proposal for meeting the water pollution control needs of the entire Schuylkill River Drainage Basin, the proposed project was evaluated for its consistency with such water pollution control plans and objectives as now exist.

It is generally acknowledged that the large number of small sewage treatment plants in the Spring City to Norristown reach of the Schuylkill River does not provide the optimal long range solution required for this portion of the region. Even though the proposed Valley Forge project may be viewed as fitting into the existing small plant concept between these two points, it is generally looked upon favorably by various agencies or authorities responsible for the project's review.

In an October 29, 1971 report by the Delaware Valley Regional Planning Commission, the comments and recommendations of various review agencies on the proposal were provided as well as those of DVRPC, which may be summarized as follows:

1. DVRPC found the project to be consistent with the Regional Water Pollution Control Plan and planning process, and achieving regional objectives in this portion of the region in that:

   (a) The Plant was designed to adequately serve a projected 1985 equivalent population of 80,000 persons.

   (b) The Plant will provide a reduction of 95% of the BOD and 96% of the Suspended Solids and produce an effluent which meets the existing water quality standards of Pennsylvania and the Delaware River Basin Commission.

   (c) DVRPC amended its Regional Water Pollution Control Plan on July 22, 1970 to designate the Plant as the sub-regional sewage treatment plant with the responsibility of providing treatment capacity on an equitable basis for municipalities in the French and Pickering Creek Drainage Basins comprised of East Pikeland, Schuylkill and Charlestown Townships; and the Valley Creek Drainage Basin comprised of Tredyffrin, East Whiteland, Malvern, Willistown and Easttown.

   (d) The facility and service area were consistent with regional and local land use and development plans.

   (e) The proposed facilities provided an economically feasible solution for meeting the water pollution control needs of the area.

2. The Chester County Planning Commission endorsed the proposed project as being consistent with the Chester County Master Sewerage Plan (537), as amended in April, 1970 (See Section I.C, "Brief History of the Proposed Project and Grant Application").

3. The Chester County Health Department endorsed and encouraged the project.

4. The Pennsylvania Department of Environmental Resources issued a permit authorizing construction of the project and endorsed the project as being consistent with the Act 537 Plan.

5. The Delaware River Basin Commission included the project in its Comprehensive Plan and further approved construction of the proposed facilities. (Docket D-71-117-CP).

6. The Montgomery County Planning Commission indicated that it considered the project to be inconsistent with overall water quality management and good regional planning. The following is taken directly from its March 22, 1971 letter to DVRPC:

> "The Valley Forge Sewer Authority, which is comprised of several municipalities in Chester County, is contemplating construction of a new waste water treatment facility somewhere along the Schuylkill River in the vicinity of its confluence with French Creek. At the writing of this report, it appears as though this facility has the endorsement of all required regulatory agencies. Even though wheels are turning to implement this plan, it is our intention here to let others recognize that we feel that construction of another facility along this reach of river is inconsistent with overall water quality management and good regional planning."
>
> "As previously mentioned, this reach of the Schuylkill is the most complicated area in regards to waste water treatment facilities in the entire County. Another facility would only add to this complication. We feel that all reasonable alternatives for the disposition of waste waters from the Valley Forge Authority area have not been investigated. Design and construction of this plant should be put off until the County or counties have time to have an in-depth regional feasibility study made of this region. If it is then found that results of this study support the presence of another plant, then work on this plant should be allowed again to continue."

7. The Phoenixville Area Retailers Association also objected to the project. In a June 11, 1971 letter to DVRPC, the following comments were made:

> "While we agree that these areas need sewage disposal facilities and we are in favor of these facilities being installed, we feel, however, the comprehensive plans adopted by DVRPC have not been implemented in Chester County...."

> "Under the DVRPC Plan...the Regional Land Use Plan recommends... a pattern of land use which can assist them in achieving the following goal - The rejuvenation of the old urban areas."
>
> "We request EPA withhold any financial assistance to V.F.S.A. unless and until Chester County adopts a County Comprehensive Plan and Land Use Plan with related zoning under the goal of DVRPC to rejuvenate the old urban areas...."

Responses to these latter two objections have been included in the Appendix to this EIS.

C. Environmental Impact of the Proposed Action

The construction and operation of the Plant and associated sewage collection system will produce substantial changes in the immediate environment and remaining natural ecosystems. The rationale for the construction of the sewage facilities is the alleviation of a current water quality problem and public health hazard within the Study Area, to provide a mechanism to allow for orderly future growth and to provide existing and future generations a healthful and aesthetically pleasing environment.

The construction of the project will create significant long and short-term changes in its areas of impact. Although these changes are intended to be strictly desirable, it is recognized that there will be some short and long-term undesirable impacts. The desirable impacts will be, most significantly, the correction of a potential public health hazard, the improvement of soil and water quality conditions, the mechanisms for orderly growth and the removal of several sources of raw sewage now flowing into the Schuylkill River. The accepted undesirable impacts on the area will consist of the short-term inconveniences due to construction, the long-term loss of land for the Plant site and pumping stations for the duration of their usefulness and the temporary diversion of some water from one minor watershed to another. By increasing the number of feasible development alternatives possible in the service areas, the construction of any sewage system, as well as highways, water supply, power supply and other services, has the potential for creating an undesirable future environment in terms of land use. Adequate land use controls must eliminate those land use patterns deemed undesirable as outlined and made part of this EIS (see Section VI, "Conclusions and Recommendations"). Conversely, by increasing the feasible development alternatives, desirable land use patterns which are now not feasible with on-site disposal systems may be achieved. Land use aspects have previously been discussed in detail and will be discussed again later in this section.

The short and long-term impacts of the project will be identified as being either "primary" or "secondary". Primary impacts result directly from the construction or operation of the project; secondary impacts are associated with indirect results of the construction or operation. Naturally, each impact will be recognized as being either beneficial or adverse.

The impacts that the system will have on each of the physical, ecological, aesthetic, economic and social parameters of the area will be discussed in the following order:

- Water Quality
- Water Supply
- Biology
- Natural Resources
- Air Quality
- Aesthetics
- Archaeological and Historical
- Recreation
- Public Health
- Social and Economic Factors
- Land Use

1. Impacts on Water Quality

The project will have the very significant beneficial impact of improving both surface-water and groundwater quality.

Surface Waters. At the present time, most of the Study Area is drained by streams directly tributary to the Schuylkill River, a major source of water supply in the metropolitan area. The remainder of the Study Area drains directly into the Delaware River.

Section II.C.5, "Water Quality", discussed the existing quality of these streams in some detail. The data, collected, sampled and analyzed leads to the conclusion that the existing quality is in need of upgrading. In some of the streams where development has not yet been concentrated, the water quality is fair to good, supporting a variety of fish and fauna; however, the water qualitv is badly deteriorated in most developed , residential, institutional and industrial areas.

Section II.C.6, "Use of Package Sewage Treatment Plants", concluded that there are many poorly functioning package sewage treatment plants (STP's) contributing sources of pollution and enrichment that cannot be effectively assimilated by their receiving streams in the quantities and qualities which are now being produced.

The project would eliminate these sources of pollutants in the initial sewer system as indicated on Plate 3, as well as provide the means to absorb the wastes from outlying failing STP's in subsequent phases. The long-term beneficial impact of the proposed action will be to upgrade the water quality of these streams and their feeders by restoring or increasing their assimilative capacities.

At a minimum it is anticipated that the opportunities for increased recreational and aesthetic uses of these streams will be greatly enhanced provided that secondary impacts (land uses) are controlled. The importance of administering proper timing of future development construction with the availability of sewers cannot be overemphasized in order that new developments are built when treatment capacity is still available. Without this coordination, the effect of upgrading water quality by gradually eliminating sources of pollution (package plants, septic tanks) may be negated. See Section VI, "Conclusions and Recommendations".

It is further anticipated that a considerable improvement in the Pickering Creek waters will occur (potable supply at the reservoir). A potential secondary long-term impact through the elimination of major sources of pollution in the Valley and French Creeks could be the future considerations of those streams as potable surface-water supplies for major portions of the area.

The tables, charts and maps show that the Darby, Crum and Ridley Creeks will be relieved of pollutional loads at their headwaters, since the Design Service Area does extend to these areas. The benefits will be the same as those described for the creeks in the Schuylkill River Basin.

Discharge of the Plant's effluent to the Schuylkill River will have a minor impact on the inland streams. While much of the septic water flow now finds its way to the River via French, Pickering and Valley Creeks, it cannot be stated with assurance that the entire flow reaches the River. Therefore, there will be a new discharge at the confluence of the Perkiomen of an estimated flow of 8 million gallons per day in the design year (1985) and potentially higher flows in subsequent years, depending on growth in the Study Area. The Plant is designed to remove 95% of the total BOD in the summer months, provide a minimum of 5 mg/l dissolved oxygen in the discharge and contain an acceptable level of coliform bacteria. At 8 mgd average flow, a residual BOD of about 1,300 lbs. per day will be discharged at a point and will contribute to oxygen depletion in the stream.

The Schuylkill River receives heavy pollutant loads along its entire length. Acid mine drainage is primarily responsible for the water quality of the Upper Schuylkill and has a profound effect on the quality of water in the Lower Schuylkill. In the vicinity of Reading, heavy loads are discharged to the River from various industries, waste water treatment plants and power plants. The cumulative effect of these sources of pollution, plus the ever present pollutant loads carried to the River via inland streams, cause the water quality to decline steadily below the Norristown area.

There are now many treatment plants of various types serving the inland areas of both Chester and Montgomery Counties that collect, treat and discharge wastes into the tributaries of the River. These small plants, in relation to larger ones, are expensive to construct and operate (based on per unit of waste) and are usually inefficient since their small size does not attract highly qualified personnel to run them.

The proposed project would assist in eliminating these inland sources of pollution as well as providing a consistently high quality effluent to the Schuylkill River. Certainly, pollutants from the secondary treatment facility will be discharged into the River, but the quality of the effluent from this point source, relative to the cumulative effect of the existing pollutant sources, will result in the improvement of water quality in this stretch of the River and add to its water supply use and recreation potential.

Conversion of ammonia nitrogen to the nitrate/nitrites should limit the nutrient chain, thus assisting in precluding eutrophication in the Schuylkill River. Facilities are available to limit phosphates but will not be employed during initial operation.

Should it be necessary, the Plant could be upgraded to provide further removal; however, at this time, available technology to achieve higher removals consistently and within economic reason is questionable. It should be noted that design criteria set forth for the proposed facility and the current up-grade program of DER provide for the assimilation of waste discharged by the River based on a minimum low-flow condition.

The overall beneficial long-range effects of the proposed facilities will be the enhancement of the environment by increasing the recreational value of the streams (fishing, boating, etc.) and the aesthetic potential of the area, by upgrading the quality of potable water supplies and by upgrading the water quality of the Schuylkill River.

A short-term adverse impact on surface water quality will be some increase in siltation and turbidity in the river and the inland creeks as a result of sewer line construction activity near or across the streams. A strict enforcement of state environmental protection regulations will be implemented to minimize these undesirable effects. The tops of all sewers crossing streams will be located at a minimum of one foot below the bed of the stream if solid rock is encountered; and if the stream bed is soil, a minimum of three feet of cover is required. In all cases of stream crossings, the pipe specified will be cast iron encased in concrete. The proposed project, as designed, will not require the permanent relocation or rechanneling of any stream to provide for the location of a force main, an interceptor or a collector line in the system.

Another potential primary short-term but serious adverse impact on surface waters could result if the mechanical pumping facilities and their back-up systems fail, causing a temporary discharge to the small streams. Each system is supported with standby mechanical and electrical systems, but there is always the chance of a failure. Should treatment facilities fail through the back-up systems, the gravity processing would continue to operate, removing settleable solids. Alarm systems, portable maintenance equipment and qualified operators will be available and trained to anticipate unexpected emergency conditions.

Groundwater - Most of the groundwater in Chester County comes from rain or snow falling directly above and not from distant sources via underground channels. Due to the low porosity and permeability of the underlying rock, the County has limited groundwater resources.

The major source of groundwater in the Study Area is the area which underlies the Chester Valley limestone belt and is designated on Plate 12, "Aquifer Recharge Area". Because of the chemical action between air, water and limestone, the groundwater sources below the Valley are suseptible to contamination from run-off and malfunctioning on-lot septic tanks in addition to other previously mentioned sources.

Future water supply needs may cause a private utility to draw heavily on this source of groundwater to meet consumer demands. If corrective action is not taken soon to eliminate the sources of groundwater pollution, such use may not be available.

The major primary effect of the proposed project on groundwater quality will be the elimination of sources of pollution (septic tanks, package STP's, industrial/institutional package plants etc.) and the control of run-off (ordinances for retention of storm water - see Section VI, "Conclusions and Recommendations"). In addition, the upgrading of the water quality in the inland streams will add to the enhancement of groundwater quality.

Also, as a result of a thorough soils analysis and the designation of areas experiencing a seasonally high water table, areas identified as requiring sewer service would allow for the elimination of septic tanks that might normally be constructed.

2. Impacts on Water Supply

The primary long-term effects of the project on water supply are the (1) potential lowering of the groundwater table and (2) flow reduction of the inland streams.

a. Effects on Water Table. Because of abundant rainfall and the limited capacity of most of the underlying rock to absorb and store water, a potential lowering of the water table is difficult to evaluate under normal weather conditions. In the event lowering of the water table should take place, the elimination of septic waters would have the beneficial secondary long-term effect of compensating for a potential decrease in water quantity by a definite increase in quality since normal water run-off will be able to replenish the aquifers.

If we assume one family per acre and 350 gpd per family, the annual discharge per family per acre can be calculated as follows:

350 gpd x 365 = 127,750 gallons per year per family

7.48 gallons = 1 cubic foot

127,750 gallons per year = 17,800 cubic feet per year per family

1 acre = 43,560 square feet

$$\frac{\text{17,080 cubic feet per acre per year}}{\text{43,650 square feet}} \approx 0.392 \text{ feet} = \approx 4.7 \text{ inches of water}$$

This diverted discharge will be minimal compared to the average rainfall in Chester County of 45 inches even if it is considered that only 50% infiltrates the ground to replenish the aquifer and the streams. Consequently, it is not anticipated that a significant impact (beneficial or adverse) on the groundwater table or groundwater supplies will occur.

b. Malvern Water Supply. Continued concern over the effect of the proposed sewer system on the water supply for Malvern Borough has resulted in a study conducted by this Agency utilizing information made available by the Malvern Borough Planning Commission, Pennsylvania Department of Environmental Resources (Water Resources Bulletin), DVRPC, and the consulting engineering firm of SCR, Inc., of Malvern, Pennsylvania.

Malvern now has its own water supply system which depends primarily on wells and springs. The Philadelphia Suburban Water Company has a direct tie-in with the Malvern Borough water supply system, located at Highland Avenue and Sugartown Road. The capacity of this connection is restricted to a maximum rate of 300 gallons per minute or a total volume of 300,000 gallons delivered in any one day. The Company sells water to Malvern in accordance with an agreement dated March 18, 1971, between the Company and the Borough.

EPA has been notified by the Company that no other agreements or assurances exist with Malvern regarding water supply, nor does the Company anticipate any change or revision in the agreement to provide any additional services. More importantly, the 1971 Agreement gives the Company "the right to curtail or interrupt the supply of water to the Borough if, in its judgment, it is necessary to do so in order to adequately serve its own customers.... Company shall not be obligated to furnish any quantity of water to the Borough which, if added to the quantity of water the Company...to exceed the quantity of surface water which it is permitted to withdraw under permits issued by the...Department of Environmental Resources.... In addition, the Company may terminate this agreement at any time, ... if the Company...determines that the continuation of the sale of water to the Borough hereunder jeopardizes the maintenance of full and adequate water service to the Company's customers other than the Borough." (emphasis added) In light of the continued concern of all municipalities for full and adequate future water supplies, Malvern does find itself in a delicate bargaining position regarding this "emergency" water supplied by the Suburban Water Company.

The Borough of Malvern is underlain, as the EIS points out, by a Wissahickon Schist Formation from which the surface and subsurface water supplies are derived. In general, the Wissahickon Formation is gray to green, medium to coarse-grained schist that may be gneissic in some localities. The formation is characterized by the presence of large amounts of mica. Areas of albite chlorite schist and oligoclase mica schist are dominant. The yields and specific capacity data from wells in similar geologic strata indicate that the albite chlorite schist is a poorer aquifer than the oligoclase mica schist.

Data obtained from the Department of Environmental Resources show that wells in the oligoclase mica schist will almost always yield enough water for domestic supplies. However, the cost of exploration will be relatively high, because several poor wells may be drilled before a successful one is obtained.

The northern portion of Malvern is underlain primarily by the chlorite schist. Generally, water (hard) supply yields are very small to moderate. Data has shown that a relatively large percentage of the wells drilled in this unit fail to obtain adequate domestic supplies. The southern portion of Malvern is characterized by a mica schist containing a high percentage of quartz-rich and Feldspar-rich formations. Generally, water (moderately hard) supply yields are small to moderate with only a very small percentage of the wells drilled in this unit not producing domestic supplies.

The surface water supplies fluctuate in direct relationship to the amount of precipitation in the area. Historically, it has been evident that the water supply is greatly depleted during periods of low rainfall and drought.

Malvern, located along a ridge, is a very compact community of approximately 2,800 people within a 1.2 square mile area. According to population data and projections, the Borough will continue to see an increase in population primarily due to an influx of large apartment complexes. Certainly the amount of open space within the Borough will dwindle quickly with the construction of these new dwelling units. A high percentage of impervious cover will accompany this construction causing more and more rainfall to be diverted from the groundwater supplies.

It is estimated that the amount of water supply contributed by springs is between 55 and 70%, with the remainder being produced by wells. It is important to note that the 4 springs primarily responsible for water supply are on the upper north end of the drainage basin while the wells are on the south end.

With the introduction of increased amounts of impervious cover and the relocation of septic water (due to sewers) normally discharged by homes to the ground for purposes of waste disposal and recharge, it is anticipated that a lowering of the water table will affect the spring yield in the northern section of Malvern. Therefore this source of water supply will also be affected, although the exact degree of impact is difficult to quantify without further detailed investigations. It is not anticipated that the wells will be affected because of their deep entry banks.

The existing groundwater levels in the Malvern area are an artificial condition produced by the septic tank effluent. Continued recycling of this water will introduce proportionately more and more contaminants to the groundwater and springs. The effect of the sewers will be to restore the groundwater back to its original and natural state, leaving the springs to be recharged by precipitation only. The loss of any spring yield which could present water supply problems will be compounded by the increased demand for water as a result of continued population growth and expansion of the community. It is felt that the future demand will outstrip water supplies unless certain safeguards are undertaken.

In summation, a number of points should be made clear:

(1) Continued growth of the Malvern area and surrounding municipalities will result in a greater demand for water.

(2) Malvern is completely surrounded by areas already permanently tied-in to the Philadelphia Suburban Water Company.

(3) The Water Company may at any time cut off Malvern's "emergency" supply to fully supply its permanent customers.

(4) The springs in Malvern contribute between 55 and 70% of the Borough's water supply.

(5) Removal of the septic tank effluent (via sewers) will increase ground and surface water quality but will probably reduce the yield of these springs due to a reduced water table.

(6) Water supply from existing wells will probably not be sufficient to supply the Borough with an adequate supply of domestic water especially in light of the anticipated growth and demand.

(7) Well exploration in the northern portion of the Borough will probably not prove successful due to the geologic make up and data accumulated to date.

(8) Well exploration in the southern portion of the Borough will most likely result in obtaining sufficient quantities of water supply for domestic use, provided the demand does not run ahead of the production.

The conclusion that must be reached in light of the above information is that Malvern Borough should promptly begin to implement its 5-year water system improvement program. Addditional construction of wells to service existing needs (as a result of even a partial loss of the spring yield) and future demands is of the utmost importance if the Borough is to realize sufficient supplies to the domestic and industrial sectors of the community.

As far as the need to tie-in to Philadelphia Suburban Water Company, only intense studies and investigations will be able to determine if the available supplies will be sufficient to adequately service the community's long range needs, independent of outside sources. EPA does not now fund such studies although money may be available under the Farmers Home Administration, the Pennsylvania State Revenue Sharing Office and possibly the Water Programs Division of EPA Headquarters (Washington, D.C.). It is urged that contact be made first with the Regional and State Offices of the Farmers Home Administration before approaching these other sources.

In addition, it may be advisable for Malvern Borough to retain consulting services in addition to SCR to estimate the value of its water supply system and negotiate with Philadelphia Suburban Water Company for purposes of attaining permanent customer status. Any conditions for the sale of the Borough's system to the Water Company will be governed by the effective Rules and Rates of the Company for water services as filed before the Pennsylvania Public Utility Commission to ensure proper and just compensation. (See Section VI, "Conclusions and Recommendations").

c. Impact on Inland Streams. The implementation of the project will have a minor primary effect on the velocity and possibly the depths of the inland waters by eliminating these imported waters; the creeks will return to a more natural state, and will most likely display a lower flow.

The impact created by the diversion of the flow from the Crum/Darby/Ridley Watersheds into the Schuylkill River Basin should be considered inconsequential since the amount involved is so small. If we assume a 100 gpd water usage per person, the amount of water diverted will only be 1.58 mgd initially and a projected 3.36 mgd by the year 2010.

The Plant's effluent is not anticipated to have a hydraulic effect on either the Schuylkill River mechanics or the recreational use of the waterway. At design capacity, the river will receive a flow of 12 cubic feet per second from the Plant, which is negligible when compared to the flow of the river (1,793 cfs at Pottstown, Pennsylvania). The lowest instantaneous flow on record was 87 cfs in 1930; it is unlikely that this situation will recur since planned and existing reservoirs will augment low flows in the future.

Based on information available to DER, the minimum 7-day consecutive low flow of the Schuylkill River in the vicinity of the Plant is 290 cfs or 186 mgd. This figure has a probable recurrence factor of one in 10 years. Records at the Pottstown gauging station are more complete, and a minimum low flow at that point is 260 cfs or approximately 167 mgd. The average flow of the river at Pottstown, based on 36 years of records, is 1,884 cfs or about 1,208 mgd.

d. Limerick Nuclear Generating Station. With regard to the interaction between the Valley Forge sewage treatment facility and the proposed Limerick Nuclear Generating Station 16 miles upstream, the Delaware River Basin Commission on March 29, 1973 came to the following conclusions:

" I. Full consideration of the (Limerick) project ... is deferred pending the completion of an environmental impact statement. (A Final EIS has now been completed.)

"II. The water supply features of the project are conditionally approved within the limitations of the above finding...."

The findings referred above include:

" 1. Schuylkill River water at the plant may be used for consumptive use when flow (not including future augmentations of flow from Comission sponsored projects) as measured at the Pottstown gage is in excess of 530 cfs (342 mgd) with one unit in operation and 560 cfs (362 mgd) with two units in operation with the following exceptions:

a. ...no withdrawals when river water temperatures... are above 15°C ... except when flow ... is in excess of 1971 cfs.

b. Use of the Schuylkill River will be limited to a withdrawal that will result in an effluent that meets all applicable water quality standards."

The Commission added "constraint on consumptive use... is to protect water quantity and quality below the Limerick Station."

"2. Perkiomen Creek water may be used when flows...at Graterford... are in excess of 180 cfs (116 mgd) with one unit... and 210 cfs (136 mgd) with two....

"3. The Delaware River... may be used... via... pumping facilities and... the East Branch of Perkiomen Creek... and will be maintained at not less than 27 cfs (17.5 mgd) for the protection of aquatic life... regardless of ultimate downstream consumptive use requirements."

The average consumptive use of water (i.e., water not returned to the River) projected by Philadelphia Electric Company for the proposed Limerick power plant is 54 cfs. This Company has proposed that, when flows exceed 500 cfs at the Pottstown gauging station, consumptive water will be taken from the Schuylkill River. At lesser flows, the plan provides for the consumptive make-up water to be taken from Perkiomen Creek. In turn, Perkiomen Creek at low flows will be supplemented by a diversion from the Delaware River.

Therefore, on the basis of this information, the Limerick power plant would not affect water usage on discharges to the Schuylkill River at the Plant site when the river flows are below 500 cfs. Above 500 cfs, the effect would be minimal.

e. Population Growth. Two secondary long-term adverse impacts on water supply which can be anticipated by the potential population growth associated with sewered areas are:

1. An increase in demand, placing a burden on the water companies importing waters from the Schuylkill River and adjacent reservoirs for their customers.
2. Increased flooding conditions due to the increase in impervious covers in developed areas, which could be alleviated by (a) the economically prohibitive alternative of imposing a total ban on development in the existing floodplain and the conservation of the remaining area in its natural state, and (b) the practical alternative of adopting regulations to control the use of land to protect soils and water resources and mitigate the adverse impacts due to increased run-off and flooding potential (see Section VI, "Conclusions and Recommendations").

f. Flooding. With regard to potential flooding situations affecting the operation of the Plant or pumping stations, due to the topographic features of an area, the advantages of gravity flow, and the need to locate pumping stations in a logically convenient place to lift sewage over natural topo barriers, it has become normal practice that pumping stations and often treatment plants encroach close to and are often constructed in what is considered to be a floodplain. When the latter is the case, the pumping station is designed so that the electrical and mechanical components are above known flood elevations.

In analyzing flood elevations with regard to sewage facilities, the following sources of information are used:

1. U.S. Army Corps of Engineers
2. U.S. Geological Survey
3. State, County or Municipal Records

4. **Eyewitness Records**

5. **Field Observation of Natural High Water Marks**

Based on data obtained from these sources, engineers' computations are made to extrapolate elevations at known points to the sites in question. Preferably, these elevations are given on the basis of frequency of occurrence such as "once in 5 years", "once in 10 years", etc. Regarding the facilities in this project, there are no known records of elevation of the 1972 flood (Hurricane Agnes) at principal sites based on eyewitness accounts and field measurements made when the floodwaters receded.

Based on available data, it appears that the 1972 flood established elevations greater than what had previously been considered the 100-year probability.

In response to an inquiry of May 21, 1973, the Corps of Engineers stated that although it did not have completed floodplain reports for the project area, it did have the following data along the Schuylkill River:

TABLE V-3

	Flood Elevation (MSL)			
Location	August 1955	May 1962	June 1972	100-Year
Confluence of Valley Creek and Schuylkill River	80	79	88	89
Confluence of Pickering Creek and Schuylkill River	90	90	97	97
Confluence of French Creek and Schuylkill River	90	91	97	98

Using the U.S. Department of Interior Geological Survey publication, "Floods in Pennsylvania; Frequency and Magnitude", by W. F. Busch and L. C. Slaw, 1960, and as outlined on page 21, Definition of a Frequency Curve, a discharge in the Schuylkill River was computed for 5, 10, 25, 50 and 100-year storms for selected points along the watercourse.

Using the Manning formula for open-channel flows, stream cross-section and the above discharges, computed elevations were established for key points in the system.

Table V-3 is a tabulation of the computed elevations for the three main pumping stations in the project area which would be most prone to flooding and for the Plant site. Also shown is the elevation of the first floor (exposure point) for the pumping stations and key structural elevations for the Plant. It can be seen that the units are above the 100-year frequency flood.

Computations for the Plant site regarding the 1972 flood reveal that 18.5 out of a total of 30 acres were flooded.

As a result of the 1972 flood, the critical elevations of the Pickering and French Creek pumping stations have been redesigned so that all pumping stations and the Plant are safe with respect to known floods.

All pumping stations in Tredyffrin, Easttown, East Whiteland, Malvern and Willistown have been designed with an elevation higher than known floods, including the one of 1972.

From a practical viewpoint, the elevation of the 1972 flood at the Plant site was established at 93 feet. It can be seen that this flood would not have interrupted operations. Portions of the site adjacent to the river did flood, but current and planned future construction for areas supporting treatment works are essentially on high ground to the rear of the property. There will be some limited filling of the site to gain high ground.

3. Impacts on Biology

a. Aquatic Life. The upgrading of all the surface water quality will have a direct long-term beneficial impact on the aquatic biota, notably by increasing the diversity of species. Fishes, since they are at the top of the aquatic food chain, reflect the condition of the water more than any other group of aquatic organisms.

In a natural (healthy) stream, there is a high species diversity and a high standing crop. A total of 60, 496 specimens of 37 species were taken in 158 collections from the Schuylkill River. The five most abundant species collected accounted for 81.8% of the catch and include swallowtail shiner, spotfin shiner, brown bullhead, white sucker and banded killifish. Immature white sucker and brown bullhead comprised the major part of their numbers and collect in greatest amounts in June and July, respectively.

Species diversity in the river is low in winter but reaches a peak in mid-summer, which most likely coincides with the introduction of the young into the population of many species.

In the Schuylkill tributaries, the species diversity ranged from 32 to 0. A low rating such as this is not necessarily a sign of extreme pollution but could be rather an indication of severe scouring. In other instances, the low species diversity of the streams is generally an indication of low water quality. Sewage drainage and siltation are major causes of this low water quality. The few species of fish present are those able to tolerate waters with moderate organic enrichment. Cleaner streams will support more diverse aquatic forms and likely more game fish.

Although there could be a temporary direct impact on aquatic life due to the increase in the turbidity level and slight silting within the river and its tributaries during the construction of the project, such impact will be minimized by adhering to Pennsylvania's strict erosion and sediment control regulations.

The discharge of effluent into the Schuylkill River will cause a primary adverse impact which cannot be avoided by adding to an already organically overload stream; however, it will have the long-term beneficial effect of reducing the quantities of oils, greases, acids, alkalis, foul taste and odor-producing substances and color to levels that will not pollute the receiving stream and also be eliminating the overloading of minor tributary streams.

The Plant's effluent will be chlorinated for disinfection purposes and to prevent fouling by controlling slime and other organic growth. Chlorine additions will be monitored at the discharge to control the free chlorine residual such that it will not have an adverse effect on stream ecosystems. Due to the chemical reactivity of free chlorine, this residual will be quickly combined upon mixing with the receiving stream so that its effect on animal and plant life in the River will probably be negligible downstream of the discharge. The potential problems of overdosing chlorine is recognized and controllable.

The mixing zone of the effluent will not constitute a barrier to the passage, either upstream or downstream, of fishes or other aquatic organisms.

Accordingly, no long-term detrimental effects on the river's ecology are anticipated due to the discharges.

b. Wildlife. The only primary adverse impact of the project on wildlife will be forced relocation of habitats, temporarily where facilities are underground and permanently where facilities are aboveground. Most wildlife will be banned from the 24 acre fenced-in Plant site and will have to relocate into the vacant lands (approximately 260 acres of property) surrounding the site, all of which acreage is now and has been used as a private hunting preserve.

The long-term secondary adverse impact of the project will be the possible elimination of wildlife refuges through the expected increase in development. However, strict enforcement necessary to protect such areas will mitigate this impact if not totally avoid it. There are no known endangered nor unique species in the Study Area.

c. Vegetation. A potential primary adverse impact on vegetation is the permanent loss of some established trees, removed for the alignment of sewer lines, and the construction of the Plant and pumping stations. Construction procedures will be implemented to minimize these impacts.

4. Impacts on Natural Resources

During construction of the facilities, the most important commitments of natural resources will be clay and asbestos* for pipes and cement for the Plant and pumping stations. The Plant resources involved consist of approximately 1,500 cubic yards of concrete, 12½ tons of steel and 10,000 board feet of wood. Another approximately 400 tons of sand used in the filters could conceivably be retrieved and, therefore, are not necessarily irretrievably committed.

A direct long-term impact of the operational phase of the Plant will be the irretrievable commitments of the following resources:

- Approximately 550 lbs./day chlorine.
- 33 to 65 lbs./day polymer for flocculation purposes.
- Sand for filter.
- No. 2 fuel oil heat conditioning.
- Fossil fuels to generate the 6,500 KW needed to operate the Plant and pumping stations.

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* See footnote on p. V-9.

In addition, a potential source of brick clay for the life span of the Plant will be tied up; however, this resource is not scarce nor in short supply, nor are any others except for fossil fuel and chlorine.

Estimated power requirements for the project have been shown in Appendix 5. The source of power is the Philadelphia Electric Company (PECO) which has been furnished with an estimate of electrical power required for the project. A copy of this inquiry is included in Appendix 6 Exhibit 1. Although no assurances were initially given by PECO for supplying the needed power, after VFSA again contacted PECO at EPA's request on April 10, 1974, PECO assured VFSA that it would make power available immediately upon demand, not contingent upon the completion of the Limerick station.

5. Impacts on Air Quality

By providing a sewage collection system for regional development, the project may accelerate some growth* and increase the emissions of pollutants and accompanying degradation of the air quality. Since the effect of each pollutant varies according to its nature and dispersion characteristics, the impact of each pollutant will be analyzed by the appropriate procedure in the following subsections.

Inasmuch as several of the subsequent analyses are dependent upon the areas and/or population estimates for the nine counties which comprise the Metropolitan Philadelphia Interstate Air Quality Control Region (AQCR), the pertinent data are tabulated in Table V-4.

a. Photochemical Oxidants (Resulting from Hydrocarbon Emissions).

The impact of anticipated additional growth on hydrocarbon emissions in Chester County without any additional land use controls is presented in Table V-5. Projection of stationary source emissions is based on the tacit assumption that point source emissions will remain constant (implying no new major point sources by 1985), and emissions from area sources will vary with population.

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*For a discussion on the magnitude of such acceleration of growth, see Subsection 11, Part a.5, *infra*.

TABLE V-4

LAND AREA AND POPULATION ESTIMATES FOR THE METROPOLITAN PHILADELPHIA INTERSTATE AQCR

County	Land Area Square Miles	Population (1000's)*			
		1975	1980	1985	2000
Pennsylvania					
Bucks	614	445	479	518	618
Chester	761	305	335	371	469
Delaware	184	614	634	652	393
Montgomery	496	666	715	767	898
Philadelphia	129	1,946	1,962	1,973	1,989
New Jersey					
Burlington	830	352	384	422	522
Camden	225	472	491	512	561
Gloucester	339	190	209	231	294
Mercer	230	325	349	373	428
Total	3,808	5,314	5,558	5,818	6,472

* "Preliminary MCD Population Projections", R. G. Lembke Memo to Record, Delaware Valley Regional Planning Commission (October 10, 1972)

TABLE V-5

PROJECTED TOTAL HYDROCARBON EMISSIONS FOR CHESTER COUNTY

TONS PER YEAR

SOURCE CATEGORY	DAILY VMT	cdm	hm	SPEED FACTOR	EMISSION FACTOR	EMISSIONS
1979 LDV	5,646,000	2.38	0.20	0.78	2.06	4,640
HDV	298,000	13.3	1.70	0.78	12.10	1,450
TRANS	5,944,000	--	--	--	--	6,090
STATIONARY	--	--	--	--	--	2,376
1979 TOTAL						8,466
1985 LDV	6,140,000	0.70	0.20	0.84	0.79	1,940
HDV	323,000	12.4	0.70	0.84	11.70	1,510
TRANS	6,463,000	--	--	--	--	3,450
STATIONARY	--	--	--	--	--	2,536
1985 TOTAL						5,986

Inspection of Table V-5 reveals that, despite the substantial reductions in mobile sources emissions resulting from the Federal Motor Vehicle Emission Control Program (51% by 1979, 73% by 1985), the relative consistency of stationary source emissions precludes attainment of the 6,850 tons per year allowable emissions noted in Table II-8 prior to the early 1980's. Hence, it is evident that the primary air quality standards for photochemical oxidants cannot be achieved by the 1977 date mandated by the Clean Air Act of 1970 without a substantial reduction (approximately 33%) in vehicular travel. Moreover, on July 10, 1974 the EPA Administrator designated the AQCR as an area which required measures - in addition to the review of new and indirect stationary sources and the motor vehicle emission programs - to ensure the maintenance of primary (health related) standards for photochemical oxidants (39 Fed. Reg. 25330, 25348). A "comprehensive growth analysis" was required to be prepared for this area, which was designated an "Air Quality Maintenance Area" (AQMA). Even though the Study Area is only one portion of the Metropolitan Philadelphia Interstate AQCR, it does serve to underscore the need to consider the adoption of land use controls as a means of analyzing the projected growth in the Study Area.

b. Carbon Monoxide (CO)

The CO impact of increased traffic on the major arteries is presented in Table V-6, which indicates a substantial reduction in peak-hour CO levels, due chiefly to the effects of the Federal Motor Vehicle Emission Control Program. It is thus apparent that, despite the anticipated growth in vehicular traffic, no excessive CO concentrations are anticipated and CO was not one of the pollutants for which the AQCR was designated an AQMA.

Since the traffic projections listed in Table V-6 do not account for the additional traffic anticipated to result from potential major indirect sources (e.g., shopping centers, sports complexes, industrial parks) which may be planned for future construction, it is imperative that these effects and their potential impact on local concentrations of CO be quantified. Sample calculations* indicate that peak-hour traffic generated by a shopping center with 500,000 sq. ft. of retail shopping space (which corresponds to 1,400 trips per peak hour) may well lead to violations of both the one-hour and eight-hour CO standards, particularly if the anticipated traffic volumes exceed 50% of the roadway capacity. Although current Federal regulations for the review of indirect sources (39 Fed. Reg. 7270 (Feb. 25, 1974), 25291 (July 9, 1974)), require review of all plans for indirect sources with more than 1,000 parking spaces, the subject regulations do not apply to facilities which are under construction prior to January 1, 1975. Although the indirect source regulations do not apply to projects commenced prior to January 1, 1975, the

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*"Interim Guidelines for the Review of the Impact of Indirect Sources on Ambient Air Quality", U.S. Environmental Protection Agency (July, 1974).

TABLE V-6

PROJECTED (1985) PEAK-HOUR CO CONCENTRATIONS ALONG HIGHWAY LINKS IN THE VALLEY FORGE AREA

Highway Link	ADT	Peak Hour VPH	Emission Factor	CO Concentration
Route 202, Great Valley	32,000	3,200	6.0 GPM	4.14 ppm
Route 202, Devon	41,000	4,100	6.0	4.18
Route 202, King of Prussia	55,000	5,500	6.0	5.83
Route 252, North of 30	17,500	2,100	6.8	5.29
Route 252, South of 30	16,000	1,920	6.0	4.08
Route 30, Paoli	25,000	2,750	8.5	4.17
Route 30/252 Intersection	41,000	4,510	13.0	6.5

air quality review of such projects is essential if the AQCR is to maintain National Ambient Air Quality Standards in the vicinity of the proposed indirect sources (CO and photochemical oxidants). Each participating municipality should consider reviewing the air quality impacts of indirect sources in connection with the issuance of any construction permits approved prior to January 1, 1975.

c. Non-degradation Criteria

In accordance with EPA's proposed rules* for the "Prevention of Significant Air Quality Deterioration", 38 Fed. Reg. 18986 (July 16, 1973), analyses were performed to determine the effect on air quality of a significant increase in the Study Area's population by the target years of 1985 and 2000. In line with the intent of the non-degradation regulations, analyses were performed on two pollutants, sulfur dioxide (SO_2) and particulate matter, since these are area-wide pollutants which are due primarily to emissions from stationary sources.

Four alternative plans for evaluating air quality deterioration had been proposed in the non-degradation regulations:

(1) Air quality Increment Plan - This plan would establish a nationwide maximum allowable increment in ambient concentrations above the baseline air quality concentrations (defined as the maximum air quality concentrations measured or estimated in an area that are representative of the year 1972 plus the estimated increase in those concentrations caused by sources that have been approved for construction). The allowable increments would be a 10 micrograms per cubic meter (ug/m^3) rise in the particulate matter annual average and a 15 micrograms per cubic meter (ug/m^3) rise in the SO_2 annual average.

(2) Emissions Limitation Plan - This plan would establish a ceiling for future emissions. Two methods would be used to generate ceiling rates for allowable future emissions and the higher ceiling rate would then be adopted. With the first method, called the emission density method, the ceiling rate would be determined by multiplying certain emission density factors in tons of pollutant per year per square mile by the area of the AQCR or region under consideration. The proposed emission density factors would be 1,150 kg/year/sq km (3 tons/year/sq mile) particulate matter and 3,5000 kg/year/sq km (10 tons/year/sq mile) SO_2. The values derived using the emission

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* As indicated, the alternative plans described in this section were originally proposed in July, 1973 and reproposed on August 27, 1974 (39 Fed. Reg. 31000). These incorporate the same elements of the Air Quality Increment, Emission Limitation and Area Classification Plans as included in the July, 1973 proposal. Thus the following analyses are equally applicable to the August 27 reproposals.

density method would then be compared with the values for existing emissions in the area. If the derived values were greater than the existing values, the difference between the two would be the established allowable increment in future emissions. With the second method, the ceiling rate would be determined by simply adding 20% to the baseline emission rate, assuming that the baseline emission rate is known. The ceiling rates derived using the two different methods would then be compared and the higher rate adopted.

(3) Local Definition Plan - This plan would authorize the states to set the allowable degree of air quality deterioration on a local basis, to delineate air quality areas and to define significant deterioration.

(4) Area Classification Plan - This plan is very similar to the Air Quality Increment Plan, the difference being that this Plan would establish two separate zone classes of deterioration, with more stringent criteria for one zone than for the other. The more stringent criteria would be applied to very clean areas in which a State did not want to permit air quality deterioration.

The Emission Limitation Plan (ELP) was used to analyze the impact of SO_2 and particulate emissions in Chester County. The other plans were considered impractical because they required detailed input information which is not available or because they required State determinations of areas of zones that were likewise unavailable.

d. Particulates

Using the emission density method described above and the land area tabulated in Table V-4, the ceiling rate for allowable future emissions of particulates in the Metropolitan Philadelphia Interstate AQCR can be calculated as:

CER_1 (Particulates) = 3 tons/year/sq mile x 3808 sq miles = 11,424 tons/year

Inspection of Table II-9, reveals a current emission rate of 1,049,497 tons/year for particulate matter in the AQCR. Since the baseline emission rate far exceeds the ceiling emission rate calculated above, it is apparent that the emission density method is inapplicable for the determination of appropriate control techniques.

Application of the second method, which permits an emission ceiling of 120% of the baseline emission rate for the AQCR, yields the following criterion:

CER_2(Particulates) = 1.2 x 1,049,497 tons/year = 1,259,396 tons/year

which indicates a net allowable increase of 209,899 tons/year

By assuming that point source emissions will remain constant, and that area source emissions will increase in direct proportion to population, consideration of Tables II-9 and V-5 reveals the following projected increases in particulate emissions in Chester County:

Year	Area Source Emissions (tons/yr)	Increase in Emissions (tons/yr)
1974	12,678	-
1985	15,400	2,722
2000	19,420	6,742

Hence, it is apparent that projected emissions of particulates in Chester County with 20% of the AQCR area and 5.4% of its population will account for 1.3% and 3.2% of the allowable emission increase for the entire AQCR in 1985 and 2000, respectively. According to this criterion, the anticipated additional growth in Chester County encouraged by the project even if no additional land use controls were adopted, would not contribute significantly to the potential deterioration of particulate air quality in the AQCR.

A third indication of the impact of growth in population and particulate emissions on air quality in the region can be quantified by applying theroll-forward techniques* to the anticipated emissions. Projected maximum concentrations of particulates adjacent to the Study Area are summarized in the following tabulations:

Year	Total Particulate Emissions (tons/year)	Maximum Concentration (parts per million)
1974	17,372	175**
1985	20,094	202
2000	24,114	243

It is thus evident that the growth anticipated after the construction of the proposed project, if unrestricted, could lead to atmospheric concentrations of particulates which approach the primary air quality standard of 260 ppm.

The assumption of no additional major point sources, implied in the projected emissions tabulated above. indicates that the construction of any major point sources in Chester County would result in further increases in particulate concentrations. For example, a

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* Concentration is proportional to regional emissions.

**The highest recorded eight-hour average concentration is assumed to be representative of the 24-hour average, upon which the primary standard is based.

1,000 megawatt coal-fired power plant that meets Federal new source performance standards will emit about 4,400 tons per year of particulates, and would result in anticipated maximum concentrations of 247 mg/m and 289 mg/m in 1985 and 2000, respectively.

Hence, it is obvious that primary air quality standards for particulates can be maintained in Chester County only by adopting a policy of growth limitation, through restricting the construction of new major point sources of particulates. In addition, it is evident that existing control regulations for major sources of particulates must be strictly enforced.

Particulates are one of the pollutants for which the AQCR was designated an AQMA by EPA on July 10, 1974.

e. Sulfur Dioxide

Using the emission density method described above and the land area tabulated in Table V-4, the ceiling rate for allowable future emissions of SO_2 in the Metropolitan Philadelphia Interstate AQCR can be calculated as:

$$CER_1 (SO_2) = 10 \text{ tons/year/sq mile} \times 3808 \text{ sq miles} = 38{,}080 \text{ tons/year}$$

Table II-9 indicates a current emission rate of 853,841 tons/year for SO_2 in the AQCR. Since this baseline emission rate far exceeds the ceiling emission rate calculated above, it is apparent that the emission density method is inapplicable for the determination of appropriate control techniques.

Application of the second method which permits an emission ceiling of 120% of the baseline emission rate for the AQCR, yields the following criterion:

$$CER_2 (SO_2) = 1.2 \times 853{,}841 \text{ tons/year} = 1{,}024{,}609 \text{ tons/year}$$

which indicates a net allowable increase of 170,768 tons/year.

By assuming that point source emissions will remain constant and that area source emissions will increase in direct proportion to population, consideration of Tables II-9 and V-4 reveals the following increases in SO_2 emissions in Chester County:

Year	Area Source Emissions	Increase in Emissions
1974	12,970 tons/yr	-
1985	15,800	3,170 tons/yr
2000	19,800	6,830

Hence, it is apparent that projected emissions of SO_2 in Chester County (with 20% of the AQCR area and 5.4% of its population) will account for 1.9% and 4.0% of the allowable emission increase for the entire AQCR in 1985 and 2000, respectively. According to this criterion, the anticipated additional growth encouraged by the project, even if no additional land use controls were adopted, should pose no SO_2 problem in Chester County.

A third indication of the impact of growth in population and SO_2 emissions on air quality in the region can be quantified by applying the roll-forward technique* to the anticipated emissions. Projected maximum concentrations of SO_2 in Chester County are summarized in the following tabulations:

Year	Total SO_2 Emissions (tons/year)	Maximum Concentration (ppm)
1974	53,208	.013**
1985	56,378	0.0137
2000	60,038	0.0146

Therefore, even though SO_2 was the third and final pollutant named for the AQCR in its designation as an AQMA, nevertheless the growth anticipated to result from the proposed project should not lead to any violation of the primary air quality standard of 0.14 ppm in the Study Area.

f. Summary

Results of the foregoing analyses indicate that the anticipated additional growth which will be encouraged by the proposed project, if permitted to occur without sufficient land use planning and controls, may contribute to substantial violations of the primary air quality standards for photochemical oxidants and particulates. Moreover, the construction of any sizeable indirect sources (e.g., industrial parks, shopping centers, sports complexes) which lead to high concentrations of vehicular traffic, may well result in localized violations of the carbon monoxide standard, as may the construction of sizeable point sources viz-a-via the SO_2 standard.

Anticipated impact of growth, in part attributable to the proposed project, without appropriate regulations to minimize the proliferation of vehicular traffic and/or new stationary sources, is summarized in Table V-7. Inspection of Table V-7 indicates that, with such unregulated growth, excessive oxidant levels will persist, beyond 1980, and violations of the particulate standard can be expected, beginning within the next several years, if any new major point sources are constructed in the Study Area. In order to forestall such violations, protective measures and coordinated land use planning becomes necessary for the Study Area. See Section VI, "Conclusions and Recommendations".

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* Concentration is proportional to regional emissions.

**The second highest one-hour average recorded by the COPAMS Monitor is assumed to be representative of the maximum 24-hour average.

6. Impacts on Aesthetics

a. Noise: There will be a primary short-term impact caused by an increase in noise levels during the construction period generated by the construction equipment and increased vehicular traffic connected with the job. This impact should not be felt beyond the Plant site which is located between the Schuylkill River and the Pennsylvania Railroad embankment in a most isolated area where there are no residential homes within one-half mile.

The following types of equipment are expected to be used on the site: one 1½ yard back hoe, one 3/4 yard back hoe, one bulldozer, one crane, air compressors and assorted trucks. The noise generated by these different pieces of equipment is not expected to exceed the daily ambient noise levels generated by heavy excavating equipment used in the existing quarry operation and therefore should not be noticeable to area residents.

The primary long-term effect caused by potential noise increase during the operational phase of the facilities is anticipated to be minimal since the minor pumping stations are completely enclosed and the prevailing wind patterns, with regard to the location of the Plant, are generally away from the residential and business developments.

Some increase in noise emissions during new construction activities and associated increased vehicular traffic may be viewed as a secondary short-term impact.

b. Odor: The elimination of odors from overflowing septic tanks is the most significant beneficial long-term impact on the project area aesthetics. The operation of the facilities is not anticipated to have major adverse short-term nor long-term effects on human activities.

The smaller pumping stations being enclosed and air-tight are expected to be provided with an ozonator system in the wet well to provide odor control. As mentioned previously, the Plant site is

TABLE V-7

ANTICIPATED MAXIMUM CONCENTRATIONS OF ATMOSPHERIC POLLUTANTS IN CHESTER COUNTY, PENNSYLVANIA

	BASELINE		1979		1985		2000	
POLLUTANT	Concentration	Percent of STD *	Concentration	Percent of STD *	Concentration	Percent of STD *	Concentration	Percent of STD *
Carbon Monoxide, ppm	28	80.0%	--	--	13.0	35%	--	--
Oxidants, ppm	0.163	204%	0.106	133%	0.07	88%	--	--
Particulates, ug/m^3	175	67%	--	--	200	78%	243	94%
Sulfur Dioxide, ppm	0.013	9.3%	--	--	0.0137	9.8%	0.0146	10.4%

* STD = NATIONAL AMBIENT AIR QUALITY STANDARD

remote from developed areas and the prevailing wind patterns are such that should odors develop as a result of malfunctioning equipment, the impact on residents should be minor and of short duration. Mitigative measures such as chlorination facilities for potentially odorous processes have been provided as well as secondary power supplies.

c. Structures and Sites: Because of the historic nature of northeastern Chester County, extensive consideration has been given to the location and architectural style of the major pumping stations, all above ground structures which have been reviewed and approved. (See Section V.A.8.c, "Pumping Stations - Valley Forge"). Wherever possible, these pumping stations have been located as far as possible from local residential areas. All structures have been designed to blend with the historic, social and environmental nature of Chester County; however, since aesthetics is a matter of personal taste and value, each individual will have to personally decide whether or not he or she considers any particular structure to be aesthetically pleasing.

The Plant will be built on approximately 24 acres of land currently used as a source of brick clay, and there is little or no indication that these lands would ever be rezoned residential or commercial. The setting and architecture of the Plant have been designed to minimize its impact on the waterfront and not to impede future streambank redevelopment; further, it is completely shielded topographically from any site of natural historical value, from passers-by and local residents.

All sites will be landscaped and maintained, but if residents view the Plant and pumping stations as structures destroying the area's natural setting, they will view the facilities as an aesthetic hindrance. On the other hand, if the architectural style and the positive function of the structures can overcome this conception, then the potential long-term adverse impact on aesthetics would be insignificant.

d. Construction and Operation of the Facilities: A major beneficial primary long-term effect of the proposed project will be a general enhancement of the area through a "higher quality environment". As described previously, by eliminating standing pools of septic waters from backyards and generally improving the quality of all surface waters, the entire Service Area should be a more attractive and appealing environment in which to live.

The impact on aesthetics during the construction of the Plant will be insignificant since it is situated in an isolated area; however, the installation of the sewer pipes will have the direct short-term adverse effect of creating a temporary inconvenience and causing an aesthetically displeasing visual experience in the immediate vicinity. The impact which the construction of sewage lines will have on aesthetically displeasing areas is more fully discussed in Section V.D, "Adverse Impacts Which Cannot be Avoided".

7. Impacts on Archaeological and Historical Resources

The proposed action has minimum interface with historical or known archaeological sites other than sites belonging to or within Valley Forge State Park. A review of Plate 14 (Designated Historical and Archaeological Sites) in conjunction with Plate 3 (Initial Sewer System) gives an indication of potential interfaces between construction of the sewer system and associated facilities as planned to avoid the destruction or damage to historical or archaeological sites. Pipe lines are threaded around such sites. Sites for pumping stations and the Plant are selected for reasons of topography and economics, and historical sites are avoided where possible.

The sewers of the project, other than providing service, will have little direct impact on historical homes, quarters, schools or other structures. Construction of sewers in proximity to all structures does open the potential for accidental damage. As discussed in the text, although the appurtenances of this project did initially have an impact on Valley Forge State Park since a major above-ground pumping station was planned in the Park, the station has been relocated to a more remote position (see subsection V.A.8.c above).

Although beneficial impacts of this project on historical and archaeological sites are few, the relief of malfunctioning systems such as in Valley Forge State Park is a definite beneficial long-term primary impact. The Park will have a much needed utility especially in recognition of the anticipated influx of visitors to the Park during the upcoming Bicentennial Celebration which will enable administrators to plan for better human activities in the Park and provide for a safer environment for the public.

The beneficial impact on individually occupied or publicly used sites is the same as for any homeowner.

The planned sewer lines and pumping stations do interface with historic sites such as historic villages, covered bridges and known archaeological sites as follows:

East Pikeland Township - Kimberton Village (1796) will be sewered and benefit by the elimination of failing septic systems. Adverse impacts will be short-term, primarily resulting from the construction of sewers. Additional beneficial impacts will be the improvement in local stream water quality and, in general, the same as outlined throughout this section.

A historical village can be threatened by the potential of uncontrollable development which is considered a possible secondary long-term impact growing out of the provision of all utilities and services. Again, sensitive areas such as Kimberton should be given a high priority for protection in any land use planning conducted by the municipality.

Rapp's Covered Bridge: There will be a pipe line crossing French Creek about 200 feet upstream of this bridge and an interceptor parallel to the south bank of the creek but set back about 50 feet from the bridge approach. Other than the potential for accident, there will be no impact on this structure. During construction, the bridge capacity should be fortified to eliminate overload dangers from construction vehicles.

Charlestown Township - No known designated historical or archaeological sites are being affected by the proposed action.

Easttown Township - No known designated historical or archaeological sites will be affected by the proposed action other than short-term construction impacts described elsewhere in this section.

East Whiteland Township - No known designated historical or archaeological sites will be directly affected by the proposed action other than as mentioned above.

Tredyffrin Township - Other than portions of Valley Forge State Park, the action will not directly affect other proposed historical sites.

Schuylkill Township - Other than portions of Valley Forge State Park, the action will not directly affect other proposed historical sites.

Valley Forge State Park - A major force main is proposed to parallel Valley Creek and will pass directly through the valley which contains a large number of Park historic structures.

The long-term primary beneficial impact to the Park as mentioned earlier, will be the elimination of failing subsurface sewage systems and an improvement of water quality in Valley Creek.

In addition, the availability of sewer capacity for the Park during the 1976 Bicentennial will relieve the Park of any unpleasant odors or sites which would most likely occur should existing conditions continue.

Naturally, timing is important. If construction commences in early 1975, it is possible for the lines through the Park to be constructed and in operation in time for the celebration.

Adverse short-term primary impacts will be the effects of construction of the force main and a subsurface pumping station. These effects would be excavation, construction and general disruption and inconvenience by vehicular activity. Some limitations on Park construction over rights-of-way will be a permanent impact.

Although the contractors will abide by the specifications and agreements with the Park Commission regarding finds, they are employed to install pipe lines and finds will be coincidental. Theoretically, they can make a historical find that would not otherwise have been uncovered. Likewise, not being skilled archaeologists, they could accidentially damage a find. By working closely with the Park personnel, any such uncoverage will be beneficial.

Considerable concern has been expressed by the Park Commission for the flooding potential of Valley Creek as a result of new upstream developments. Since increasing amounts of impervious cover will create additional water run-off conditions that otherwise would have been absorbed by the soils, the potential for inducing excessive flooding conditions is certainly increased. Therefore, the potential secondary impact of development in the Valley Creek Basin, if not planned properly could have a detrimental effect on the State Park and Park facilities by causing excessive flooding and silting conditions. (See Section II.B.6, "Hydrology" for further discussion of the anticipated effects on Washington's Headquarters Building resulting from flooding increases.)

It becomes increasingly important that, if any further development is to take place in the Valley Creek Basin (after thorough consideration is given to the sensitivity of the area), then such development must employ measures to minimize run-off by retaining open space, by building retention basins or ponds, and by engaging in contemporary conservation practices. The municipalities must accept the responsibility of adopting and enforcing these controls. See Section VI, "Conclusions and Recommendations".

If development is properly controlled within the Valley Creek Basin, as suggested above, there is a good chance that increased flooding and siltation conditions will be minimized and thus the flooding of Valley Creek alone should not create any adverse impact on the Park or its facilities. Of course, excessive development would most likely negate any conservation practices that might be employed simply due to the cumulative effect of each development's runoff reaching the streams and creeks within the basin.

As of this writing, there is pending before the Conservation Committee of the Pennsylvania House of Representatives House Bill No. 2134, entitled "Natural, Scenic, and Historic Areas Act", which would include, among other areas to be protected, areas "surrounding, adjoining, or contiguous with" Federal and State parks and historic areas, "which are necessary to preserve" them. Such areas would be designated by DER, and no development would be permitted therein without a DER permit.

Since some of the land contiguous to the Park remains undeveloped, if this Bill were enacted it would authorize DER to prohibit any development in the area surrounding Valley Forge, should it so desire and should it determine that such action was necessary to preserve the area. There may be other existing means by which such land could be retained undeveloped, and the Park Commission and the Commonwealth of Pennsylvania may wish to explore such possibilities while they still exist.

8. Impacts on Recreation

A primary long-term beneficial impact will be the increased recreational value of the streams as cleaner waters will generate opportunities for more water-related activities such as boating and fishing.

Since the Plant is being built on private property, the recreational pattern in the vicinity of the Plant site is not expected to alter as a result of these facilities.

In a study prepared by the Pennsylvania DER (Water Resources Bulletin No. 4, 1968), the Plant site area is shown as being a small part of a potential Schuylkill River recreational development program. No activity is known to be underway to implement such a development at this time. While the Plant will be fenced and the operating area will not be open to the general public most of the time, the floodplain areas and adjacent areas could still be used harmoniously in a water-oriented recreational scheme.

Should the lands along the Schuylkill downstream of the discharge be opened to water contact recreation, it is felt that there will be no adverse impact. Floating materials will not be discharged, suspended solids and biodegradable organics will be removed to very high degrees and significant intestinal bacteria counts (coliform index) will be held to levels in the discharge that are generally considered good for raw water supplies and satisfactory for bathing.

Specifically regarding bacteria counts, the Plant has chlorine disinfection facilities. The permit issued by DER requires that fecal coliform concentrations in the Plant's effluent be controlled to 200/100 ml. as a geometric average and the count not to exceed 1,000/100 mg. in more than 10% of the samples. The U.S. Department of Health, Education and Welfare, in a publication entitled "Environmental Health Practice in Recreational Areas", offers the following guidelines for acceptability of water supply for outdoor bathing places:

> "Some areas of the country are reported to be able to meet bacterial standards for natural surface waters with maximum limits of coliform indexes of not more than 240 to 500 per 100 ml. Such excellent quality, is of course, greatly to be desired. However, experience indicates that other sections of the country, especially those located in more densely populated areas and among cultivated lands cannot maintain such conditions.
>
> "Waters showing a concentration of most probable numbers of coliform organisms of less than approximately 1,000 per 100 ml. are considered in most such areas to be fairly acceptable for bathing unless the sanitary survey discloses immediate dangers of human sewage pollution. However, it must be admitted that bathing beaches where the content of coliform organisms runs as high as 2,400 per 100 ml. on the basis of most probable numbers or sometimes even higher, have been used without reported evidence of illness, and this limit of 2,400 per 100 ml. is still employed as a criterion of acceptability in some states."

The foregoing is not intended as a recommendation for swimming directly in the effluent of a sewage treatment plant but is intended to show that there will be no noticeable adverse impact on the Schuylkill if downstream recreation uses occur.

Fair and Geyer, in a sanitary engineering text, Water Purification and Wastewater Treatment and Disposal, Volume 2, evaluate river water from a potable supply viewpoint as follows:

Milliliters of Coliform Organisms	Rating
50 - 100/100 ml.	an excellent source of raw surface water requiring chlorination and minimum other treatment.
250 - 5,000/100 ml.	a good source requiring filtration, sedimentation, chlorination, etc.
10,000 - 20,000/100 ml.	a poor source of raw water.

There is an anticipated short-term primary impact expected during construction since portions of Valley Forge State Park and other green areas which are occasionally used for recreation will be subjected to excavation for installation of pipe lines and structural facilities. Mitigative measures will be employed to protect streams from siltation and to minimize potential damages and nuisances such as noise. Provision will be made for the restoration of greenery and areas that will be damaged during sewer pump station construction. However, the project is heavy construction and will create some temporary inconveniences to the environment.

By proper retention of open space through land use controls, the secondary long-term adverse impact caused by the loss of open space associated with development should be minimized. See the last paragraph in subsection C.6, "Impacts on Aesthetics" and subsection C.11, "Impacts on Land Use".

9. Impacts on Public Health

The objective of the proposed action is to improve public health conditions in northeastern Chester County for current residences and to provide a utility that will protect the health of new citizens and future generations of the area. Therefore, the primary, short and long-term beneficial impact of the project is the elimination or eventual elimination of failing on-site systems and package treatment plants and systems anticipated to fail in the near future. All other impacts beneficial and adverse result from taking the action for this purpose.

The proposed action will result in protection of citizens against potential enteric diseases by direct contact with surface sewage or by drinking contaminated groundwater supplies. The system will also make available good surface water potentially suitable for potable uses and assist in eliminating standing pools of water and indirectly reducing mosquito-breeding areas.

The primary long-term impact of improving surface water quality naturally protects the public health in terms of water-oriented recreational activities.

Although only some individuals in the Design Service Area and Study Area are subjected to large standing pools of septic water on their property, there is indication that the rate of failure is on the increase. In addition to protecting against enteric diseases, there can be no question that relief from the conditions described and associated odors will result in a beneficial reduction of homeowner distress.

Even for those not burdened with an immediate problem, there should be a general improvement in public pride as a result of eliminating such conditions.

On a short-term basis, there can be distress situations affecting the psychological attitudes of citizens during construction as a result of noise, dust, interference with access to properties, disruption of local traffic, damage to lawns and drives even though they are usually in a public right-of-way. The project specifications and laws of the Commonwealth provide for mitigative measures against such conditions; but, with the best of control, certain circumstances will distress a minimum number of individuals. Public meetings could be conducted as a channel of communication between individuals and responsible officials to solve or at least minimize such problems.

No significant long-term primary impact is anticipated from noise or odors as a result of normal operations.

A short-term potential impact associated with public health, for which all foreseeable mitigative measures are taken by owners, governments and constructors, is the possibility of injury or loss of life associated with construction. Safety considerations are paramount but the potential for human error must be recognized.

While location of the Plant site is excellent from a public health perspective, chlorine will be used as a disinfectant and stored in one-ton cylinder lots. Experienced operators in treatment facilities have an excellent safety record in handling this chemical. It represents the only "non-attractive" nuisance item in the project that has the potential for affecting public health directly. Experience dictates that the advantages of this product in its disinfection role far outweighs the danger.

10. Social and Economic Impacts

This section describes the social and economic impacts which will result from the proposed project; discusses mitigative measures to reduce the magnitude of the negative impacts on man and his environment; and finally discusses potential adverse secondary impacts which may be avoided through joint, coordinated review of existing comprehensive land use and sewage facilities plans for the entire Study Area and the implementation of techniques and adoption of ordinances to protect environmentally sensitive areas within the Study Area.

Of primary concern in this analysis of the socio-economic impact is the cost of providing sewage service. As noted, since the preparation of the Draft EIS, the FWPCA of 1972 was adopted to permit EPA to include collector sewers as possible eligible costs. If the pending applications for collector sewers funds are granted and DER certifies an increase in the percentage of the pending grants, roughly 90% of the total project costs will be eligible for 75% grant participation by EPA. Thus, the economic impact can be greatly reduced. The revised sewer rentals based on these additional grants are discussed and shown in Table V-3. The following analysis is based on the assumption that these lower costs to the users within the Study Area will prevail.

In regard to housing, consideration should be given to the impact on existing and future housing. As pointed out in Section III, existing housing is in tight supply (low vacancy rates); the value of owner-occupied housing has increased more rapidly than inflation, and rental housing has increased in price more than twice as fast as inflation from 1960 to 1970. The 1970 Census showed that families in income groups making less than $5,000 annually were paying in excess of 35% of their income for rent. In comparison families in the income bracket of $15,000 or more were only paying 10.5% to 16.2% of their income for rent. In view of the trends cited above, existing low income families residing in the Study Area will be hurt economically by the initial costs of installing sewers and annual sewer rental charges. In field surveys, EPA found low cost housing to be located in small groups mainly in older boroughs and existing built up areas. The housing was usually of relatively high density, and in most cases sewer service could be provided at substantially lower costs than low density housing to narrower lot frontages. All low income housing located in the field in the Initial Service Area was checked against engineering drawings to determine if service would be provided, and it was found that service would be available.

Offsetting any hardships to homeowners from anticipated user charges will be the substantial benefit from having public sewers. In addition to the many amenities that will be available to the communities via this sewer system and the efforts of EPA to ensure a harmonious environment for the long-term, the convenience of public sewers will be translated into a substantial increase in the market value of homes served.

It is hoped that elderly homeowners will not be forced to sell as a result of this project. In this connection, Pennsylvania House Bill No. 2361 was introduced on May 28, 1974, to provide "sewer rent assistance to certain senior citizens with limited incomes". The Bill has been referred to the Committee on Appropriations.

Since new housing developments, where two-thirds of the development was built subsequent to October 18, 1972 (the date of passage of FWPCA), will not be eligible for collection sewer grants, future low and middle income housing in the Study Area will be deterred, and multi-family housing (apartments and townhouses) appears to be the most economically practical, if not the only way to meet the low and middle income family housing demand in the suburbs. Since multi-family housing obviously cannot rely on on-site sewage disposal or package treatment plants (as has been shown in this EIS), the only locations for multi-family housing remaining are those areas which in the future will be provided with sanitary sewage service. This service must be designed to accept the loads generated by relatively high density residential development and to be so located that the service can be provided economically.

To date, new municipalities have been reluctant to designate multi-family housing areas in their comprehensive plans and zoning ordinances, preferring to wait until the developer requests a zoning change from single family to multi-family zoning. These developers' requests have been almost invariably based on building a package plant to treat the domestic wastes. In the future it would seem wise to plan areas for multi-family housing along existing sewer lines, which should be placed near transit service to reduce VMT and improve air quality.

Future high income housing may also be multi-family, including townhouses, as evidenced by sales prices listed for such developments in the Study Area.

However, in accordance with DVRPC's Housing Allocation Plan, housing in the suburbs should meet all income groups. The following Table V-8 lists the number of units by income group allocated to Chester County.

TABLE V-8

HOUSING ALLOCATION PLAN FOR CHESTER COUNTY
BY
DVRPC - 1970-2000

Income Group	Total For Region*	No. Of Units	County As % of Region
Less than $5000	86,900	10,100	11.6%
$5,000 - $9,999	124,900	12,400	9.9%
$10,000 - 14,999	470,500	35,600	7.5%
$15,000 and over	396,000	31,100	7.8%
TOTAL	1,078,300	89,200	8.0%

*Philadelphia-Camden-Trenton SMSA.

The Chester County Planning Commission is currently allocating these units to sub-areas of the County. The DVRPC housing allocation plan in the Study Area will be based in part on balancing employed labor force with resident labor force. If and when this plan is implemented, it will greatly reduce vehicle miles of travel of low and middle income workers who now commute long distances to and from work places in the Study Area. Such a reduction of miles driven will help maintain air quality and conserve energy (gasoline), and is in keeping with the Alternative Future Land Use "C" described in Section IV. See also subsection C.5, "Impacts on Air Quality".

The proposed project used in conjunction with improved rail and bus transit service can have a profound social and economic effect on employment locations and access to jobs by workers. By siting office buildings and industries and permitting much higher densities in these land uses, sewer service can encourage newly arriving office and industrial builders to build near rail transit or provide feeder bus service. Extensive land areas now devoted to parking can be reduced, workers dependent on transit will have access to these new jobs and air quality can be better maintained.

The socio-economic impacts of historical developmental patterns have, in many instances, proved costly in dollars as well as in the loss of many natural amenities, including the following few examples:

- Development within stream flood plains has resulted in floods causing loss of property and requiring channelization of the stream which often merely moves the flooding problem downstream.

- Development has been permitted on unsuitable soils with on-site sewage facilities. When these facilities malfunction, the new homeowner, not the developer, pays to "pump out" or rebuild; health is jeopardized; water quality (surface and subsurface) is degraded; and the public (through government bond issues, etc.) finally pays the bill for wastewater treatment facilities.

- Development has been designed for the convenience of the auto driver, and has increased vehicle miles of travel which now threaten air quality and public health as well as fostering the continued consumption of natural resources (primarily gasoline). Reliance on the car has also required paving vast land areas with impervious materials for not only roads, but also for parking areas at places for shopping, employment, recreation, etc. These areas often cause flash floods, reduce the natural recharge of groundwater supplies, increase temperatures during summer months, and require snow plowing during winter months. Storm water from these roads and parking areas mixed with oil drippings are also becoming one of the major non-point sources of water pollution.

Implementation of a comprehensive planning process should result in the development of performance standards (social, economic and environmental) which, interrelated by priority and need, will be responsive to local conditions and capabilities. Utilization of this planning process should enable the communities to benefit from the construction of the proposed project in that it will:

- maintain and improve the quality of the environment and permit the rebuilding and revitalization of blighted areas.

- offer the opportunity to maintain and expand quality housing.

- balance employed labor force with resident labor force and expand job and income opportunities.

- maintain and improve community facilities (education, re-education, cultural, health).
- establish quality access (environmental, economic and social) between homes, jobs, cultural and other activities.
- reduce disease and ill health.
- allow for timely, well planned growth without excessive new costs through the orderly phased extension of sanitary sewerage services.
- insure greater use of existing and committed public investments in highways, rail and mass transit, and other community infrastructure.
- increase real estate values.
- provide the opportunity for widespread citizen participation in planning the future.

EPA mandates and other federally assisted programs do not by themselves or singly produce an overall program to accomplish all the above. However, the proposed action may provide a foundation for the comprehensive solutions to the social, economic and physical aspects of environmental problems while at the same time reducing and mitigating adverse primary and secondary (social and economic) impacts.

11. Impacts on Land Use

The impact of the proposed project on land use for purposes of this analysis is broken down into two time phases and two service areas. These are Phase One for the Initial Service Area, and Phase Two for the Design Service Area projected to meet 1985 needs. Consideration is also given to the impact of denying sewer service to lands within the Study Area. Phase One is directed to providing service according to the existing land use patterns, correcting the existing septic conditions and improving surface and subsurface water quality. Phase Two is directed, for the most part, at providing sewer service to undeveloped lands, thereby accommodating future residential industrial, commercial and institutional development. Each time phase and related service area warrants separate consideration from the standpoint of attaining and maintaining water and air quality.

There is a significant relationship between the pattern of development and water quality in terms of use (residential, commercial, industrial, etc.), phasing of construction and intensity of use (density). As noted elsewhere in the EIS, the prevailing Post World War II assumption in forging land use patterns was that all soils could absorb some domestic, industrial and institutional wastes. The lower the density of the particular land use the better the chance that the soils, particularly if they possessed all the accepted chemical and physical properties, could absorb sewage effluents. This prevailing assumption also permitted the scatteration of developments subject to the guidelines of zoning which in some cases (before 1968) were without a comprehensive planning basis.

The existing pattern of land use that is to be served in the Initial Service Area also was permitted to be built without adequate protection of sensitive environmental areas. Flood plains were encroached upon and tributary streams were placed in culverts, on-lot sewage disposal facilities were built in the flood plains, which during floods, polluted streams. Increased impervious cover accelerated storm water run-off. Without provision for retention basins and gradual release of storm flows, floods with increasing intensity required costly, unsightly stream channelization projects which destroyed aquatic biota. Slopes were built upon at high densities. Erosion and sedimentation of creeks occurred. In short, adequate land management controls did not tend to ensure protection of the environment and of surface and subsurface water quality.

The impact of the existing land use pattern based on these inadequate land management controls on the proposed project is spelled out in the staggering costs of providing sewer service to the Initial Service Area which, without Federal and state subsidies, would either be financially impossible or place an intolerable economic burden in the form of exorbitant annual sewer rentals on the public. Without such public subsidies, it is doubtful that any municipality could underwrite the proposed project as presently designed. Also, it should be noted that it was found in certain low-density areas in Easttown and Willistown Townships, which were experiencing problems of malfunctioning on-site facilities, that the capital costs were so great that it was "uneconomic" to extend service to these areas of the Townships.

Federal sewer grants were made available to correct present surface and subsurface water pollution. The law was not intended to provide a continuing governmental subsidy, and the provision of sewer service was required to be "cost-effective." FWPCA §211 (2) and 40 C.F.R. §35.925-13 preclude EPA from funding any sewer systems which would serve areas where two-thirds of the development was built subsequent to the passage of the FWPCA on October 18, 1972. In short, it became the responsibility of local government to insure that the land use and management pattern be sewered economically in a cost-effective manner. It must be remembered that sewer service costs, unlike the provision of highways which are paid for by taxes at the gas pump, are borne directly by the user in the form of front foot assessments and annual sewer rentals.

As noted in the sections of this EIS which analyze the individual municipal plans and ordinances, one of the prime objectives of many plans is "to build a tax base" or "to keep service costs down", thereby holding down tax rates. However, the economic impact of the proposed project is pervasive, impacting substantially all residences and activities served within the Study Area.

Citizens and elected officials have two ways to hold down sewer service costs. One is to continue building a tax base, including as noted in the discussion under Section IV, Part III, "Evaluation of Alternative Land Use Patterns", fostering high-density residential development, industry and commercial land uses. The other is to revise their land use plans and insure that the provision of sewer service in their communities can be economically provided without public subsidy and without exorbitant annual sewer rentals as well as maintaining water quality in the future.

a. In Phase One, the following impacts of the proposed project may be expected in the Initial Service Area:

   1. Provision of sewer service to land within the Initial Service Area will increase the value of the land significantly. Due to the relative shortage of land with sewer service in the metropolitan area, development pressure will be increased on available open land, on land currently developed at low-densities, and on old, blighted or unsightly (roadtown) areas with sewer service.

   2. Opportunities to amend local plans and zoning ordinances to develop and redevelop worn or unsightly areas of the communities will be available. Costs of the sewer service with development at higher densities can be spread across more households and business activities,thus reducing or at least maintaining low sewer rentals achieved through public subsidy.

   3. Some of the development pressure will be exerted on the existing low-cost housing for private renewal.

   4. For areas now designated and zoned for low-density, an analysis of the capital costs of providing sewer

service to these areas should be made, keeping in mind that provision of uneconomic sewer service to one area of a township increases the costs of the service to all residents served. In these low-density areas, consideration should be given to increasing the density and making them cost-effective to sewer or reducing the densities to a point where on-lot sewage disposal could take place without degrading water quality or threatening public health. The impact of the proposed project, therefore, should be to increase densities in areas served and reduce densities elsewhere.

5. Although the proposed project will no doubt accelerate the rate of population growth in the areas where service is provided, the degree to which this will happen is not clear. There has been very little research or hard data collected and all the variables which impact growth rates in regard to sewer service have not even been identified. In discussions which EPA personnel had with planning personnel at the Delaware Valley Regional Planning Commission and Chester County Planning Commission, it was thought that it was reasonable to expect a 10% increase over the population projections made by DVRPC for the Initial Service Area as a result of the project. On the other hand, by the time the Design Service Area is sewered, the growth rate will have dropped back to original projections since other land within the metropolitan area would also be sewered by that time. Nevertheless, it becomes, one could say, 10% more important to implant comprehensive planning once the project is built.

b. The impact of the proposed project on land use in Phase II for the Design Service Area (1985) raises questions relating to future uses as opposed to present uses. While many of the points discussed above are relevant to future uses and should be considered in reviewing present municipal comprehensive land use plans and controls, a greater array of impacts of the proposed project should be considered, including phasing extensions of sewer service in compliance with the County or State Sewage Facilities Act (537) requiring a plan for orderly extension of sewer service and establishing a pattern of development which comports with maintaining air and water quality. These latter points are examined in detail in Section IV, "Evaluation of Alternative Land Use Patterns", parts B ("Existing Planning and Zoning with Sewer Service") and C ("Environmentally Sensitive Plan with Sewers").

c. Consideration should also be given to the question of the land area, principally in Schuylkill, Charlestown, East and West Pikeland, and East and West Vincent Townships in the northern portions of the Study Area and the southern portions of Willistown and Easttown Townships, which are not included for sewer service by 1985. Denial of service until 1985 and thereafter will have an impact on the land use in these areas. As has been noted in this EIS, these land areas (1) generally remain open and undeveloped and therefore do not now require extension of sewer service; (2) fall in Class II and III agricultural lands which constitutes land suitable for regular cultivation; (3) are located within the Pickering Drainage Basin which is a major source of potable water for the metropolitan area; and (4) is suitable in most instances for on-lot sewage disposal facilities.

The following impacts of the proposed project on land use where service will be denied may be expected:

1. Land values will not "jump" compared to those land areas within the Initial and Design Service Area; however, these lands can be assessed as agricultural lands under Act 515, which empowers the County to covenant with land owners for the preservation of land for farm, forest, water supply or open space uses. (See Section III.F.3.a, "Open Space Preservation Under Act 515".)

2. Farmers and estate farms can enjoy continued use of the land for agricultural purposes in a stabilized land market without development pressure.

3. Low-density residential tract development can continue, provided their lots are of sufficient size to insure that on-lot disposal of domestic waters are fail-safe, and that soils are fully tested to ensure that effluents will be absorbed without adverse impact on water quality (an alternative to on-lot disposal would be chemical toilets, which would not endanger water quality).

It should be pointed out that there is nothing in the Federal or State Constitutions requiring a public service such as sewers to be provided to make land profitably usable. If there were such a requirement, it would make the cost of sewers to any user out of the question. Finally, if a developer buys land in these agricultural areas, and obtains a change in zoning, permitting high-density development which will require sewers, the costs of extending such uneconomic service would increase sewerage costs not only to the new residents but also to all who are already served.

D. Adverse Impacts Which Cannot Be Avoided

This section describes those adverse impacts which will result from the proposed action and discusses mitigative measures to be employed in order to reduce the magnitude of these impacts on man and his environment. Further, there is a discussion of some serious potential adverse secondary impacts which can be avoided but which warrant consideration.

1. Adverse Primary Impacts

Dedication of Land:

In order to construct the Plant, VFSA will acquire 24 acres along the Schuylkill River from a brick manufacturer who owns the entire 260 acre tract, of which the site is a part. The project will eliminate the site as a source of raw materials for the life of its operation. The wildlife and flora of the area will be displaced from the specific site but probably not from the immediate surroundings. As mentioned previously, the potential recreational value of the immediate site where construction is planned will be negated.

A total of 23 sites are required throughout the Design Service Area to accommodate pumping stations, of which 9 will have visible super structures, and the balance will, for the most part, be below grade. The lands which vary in acreage from 3 to as little as 1/4 acre will be committed to this use and will not be available for other human activities. While mitigating measures have been taken to reduce environmental impacts due to construction and operation of the proposed facilities, the impact of the committed loss is for all practical purposes considered final.

A necessary requirement will be the acquisition of private land and the use of some public lands, other than roads, for construction and operation of sewers. In the case of a home owner whose land is acquired after just compensation under existing market values, the sewer authorities will own the land for about a 10 ft. width in which the line is laid. This reduces the owner's use of that portion of his property.

2. Adverse Primary Impacts Which Can Be Reduced in Magnitude or Mitigated.

Most adverse primary short term impacts of a project of this nature can be reduced in magnitude by careful design and sound construction practices considering all state and federal requirements. Long term primary adverse impacts can be mitigated by experienced administrative and operating staffs. Long term secondary impacts of an adverse nature are EPA's major concerns; accordingly, substantial time and effort have been committed to insure that positive planning functions will be implemented by the municipalities to avoid the kinds of conditions that now exist without precluding natural growth options of the communities. See Section VI, "Conclusions and Recommendations".

a. During Construction

Construction of sewers will result in some disruption of the environment. The excavations exposing earth will result in some erosion of soil, some siltation entering streams, safety hazards, inconveniences and some loss or damage to private property. Provisions such as the strict adherence to state erosion and sedimentation control laws minimize the effects of construction on water quality. Trench sections are left open only for limited lengths (i.e., 400 ft.) reducing the damage from run off and minimizing safety hazards. Dust will be controlled with calcium chloride where required. Repaving will take place during the course of construction when weather permits, but it will be done in large segments rather than continuously. Designs and controls during construction are conducted to minimize removal of trees and to minimize expensive stream crossings. Professional resident inspection staffs will see that the mitigative measures are enforced. Construction of the project will only result in temporary short-range alternations to the existing land or streams, and the construction documents call for complete rehabilitation of all disturbed areas.

During construction, all work will be controlled by Federal, state and local laws which mitigate the temporary adverse impacts. In the case of erosion control, the most prominent control is the "Implementation Plan and Regulation Dealing with Erosion and Sedimentation Control" issued by DER. Participating municipalities are being required to adopt ordinances similar to DER's Erosion and Sedimentation Control Regulation which will result in further mitigation of these temporary impacts (see Section VI, "Conclusions and Recommendations").

In addition, Act 247 of the General Assembly of Pennsylvania requires contractors on public works construction to comply with Federal and state statutes, rules and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources.

In the design of the project, numerous precautions have been taken to avoid or by-pass any areas which would result in a permanent or significant alteration of the existing land forms. There are no permanent stream or road relocations. Where possible, pipe installation will be located in the shoulders of existing roads and where impossible, adequate barricades and access will be maintained for both vehicular and pedestrian traffic within construction areas. During construction, efforts will be made to preserve all vegetation, and no unnecessary clearing, grubbing, cutting or burning will be permitted.

When the construction of an area is complete, the contractor will, where required by Penn DOT or specification, overlay entire state road surfaces. Unless dictated by the specific township or borough, he will restore originally paved local roads to original condition in accordance with appropriate specifications. Unpaved surfaces will be regraded and seeded. Construction debris will be removed. The contractor is generally not required to replace trees and shrubs that property owners have placed in public right-of-ways.

b. Valley Forge

There will be two unavoidable short-range impacts on Valley Forge State Park. The first is a minor disruption of traffic during construction; the second, slightly more importance but again for a short duration, is the disruption of the aesthetic quality of the Park itself, primarily during construction and then during rehabilitation of the disturbed landscape. Again the design concept of the proposed project where pipeline rights-of-way are located does not require that the natural integrity of the environment be changed by regrading, filling or excavating; in fact, it is the intent of the presently conceived project to return those areas required for rights-of-way to their original state as soon as construction is completed.

This project will include the installation of sewage trunk lines, force mains and an underground pumping station on Valley Forge State Park property. Installation of the facilities through the Park will be done in such a manner so as not to have an adverse effect on the National Register property (see subsection V.A. 8).

1. No blasting will be done near Washington's Headquarters per agreement with the State Park Commission.
2. The pipe has been located to avoid all known future archaeological diggings such as the grist mill. If any unknown archaeological artifacts are found in the prosecution of work, the work will be stopped and the Park notified to allow for evaluation by Park officials.

3. Construction will be scheduled so as to minimize interference with Park operations.

4. The force main trench will be kept to a minimum of about 5 feet wide and 8 to 10 feet deep, and all ground will be restored to its original condition.

5. Construction has been designed to prevent damage to Valley Creek by siltation and degradation of the creek banks.

6. Installation of the pipeline will not prevent any land use over the pipe by the Park other than for permanent buildings. Obviously, the pipe must be accessible for maintenance.

All facilities in the Park will be underground and have been located with the aid of Park personnel so that manhole entrances to the facilities are hidden or their visibility minimized. All roads and grounds will be returned to their original condition.

All buildings have the approval of the Pennsylvania State Art Commission as to acceptable architectural and landscaping features. In addition, architectural approval authority for buildings on or near Park property has been given to the Park Commission by letter dated May 11, 1972.

c. Operational Impacts

The Plant and pumping stations, in general, will not have as significant an adverse impact as the sewer system. With good, efficient operation, most long-term primary environmental impacts are controllable. Moving machinery and fluids do generate a certain noise level but in this project the greatest continuing noise level will be the Plant. At the site it is anticipated that the highest noise levels will be in the buildings. At the fence line the noise levels will be on the order of 60 decibels. With the remote wooded location it is anticipated that noise from the Plant will not adversely affect the nearest residents. Pumping stations will generate little sound, particularly those in residential areas which are buried. The only devices which will create noise at a nuisance level would be the emergency generators, which are run by internal combustion engines and only run during a power outage or on short duration tests once a week or so.

Odors can develop as a result of sewage going septic without oxidation. Facilities such as ozonators and chlorine are provided to contend with energency odors. In general the operators will provide the best control against odors.

During operation, a continuing maintenance program and alarm system will minimize failures that could result in adverse effects. Dual pumps and Plant equipment provide back up systems.

Continuing analytical testing in the lab and on-line continuous analytical monitors such as measurement of chlorine residual pH, turbidity and dissolved oxygen will be provided to maintain quality control of the Plant's effluent.

3. Adverse Secondary Impacts

The EIS describes in detail effects to be anticipated on land use as a result of this project, and points out what measures must be taken in the way of ordinances to be adopted and planning to be implemented in order to mitigate the adverse (both primary and secondary) impacts that normally result from development.

During Phase One of this project (or the servicing of existing problem areas), little more than primary impacts are expected all of which can be mitigated. However, during Phase II (or the servicing of the Design Service Area), mitigation of adverse secondary impacts requires planning and legislation. The efforts put forth in this EIS have hopefully "flagged" problem areas and identified those measures that would reduce the degree of adverse secondary effects intrinsic with the development of land.

As indicated, the proposed project will increase to some extent the rate of population growth in the areas where service is provided. The potential for severe impacts occurring as a result of intensive development made popssible by the proposed sewer system is recognized. As discussed throughout the EIS, the key factor in avoiding severe environmental degradation as a result of land use development is local governmental planning and control.

Since portions of the Design Service Area and Study Area are outside the planned land use development corridors and the provision of sewer service in areas not yet proposed would be detrimental to county and local planning, an intermunicipal planning group should be designated to provide coordination to the municipalities during the necessary comprehensive planning process. This body will be made up of at least one representative of each participating municipality and a representative from the Chester County Planning Commission.

The thrust of the comprehensive planning process will be directed at the eventual revision of the Chester County Sewage Facilities Plan (Act 537) which will enable DER to review and approve future extensions in compliance with the Plan and reflective of the most sound environmental and cost-effective planning.

Certainly, without enforcement of zoning ordinances and land use designations, the probability of the occurrence of similar water and air quality degradation is high. As an example, if development is allowed to occur in the Chester Valley without recognition of the extremely sensitive environmental conditions mentioned in this EIS and without the benefit of environmental investigation, severe environmental consequences are likely.

Based on the projected rate of growth for the Study Area, possible violations of the primary air quality standards photochemical oxidants and particulates* are likely unless local planning is increased and coordinated. Restrictive regulations applied to the growth rate and implementation of the conditions contained in the "Supplement to the Sewage Facility Agreements", Appendix A (Supplements) and the recommendations presented in this EIS should greatly assist the local communities in meeting all applicable air quality standards.

E. Relationship Between Local Short-Term Use of Man's Environment and the Maintenance and Enhancement of Long Term Productivity.

The proposed sewer project will mitigate damages of an already degraded environment and provide for the enhancement of the Study Area's long-term growth and productivity. The costs, short term interference with the environment and lasting commitment of some resources are justified.

Much of the Study Area is already urbanized and subject to pressure for further development. This project will provide one means whereby local officials may implement, update and improve land use plans. Sewers can assist in protecting the environment by enabling municipalities to direct development of any reasonable density to specified areas of the municipality. Without sewers, developmental pressures are directed to those lands that can or conceivably can support on-site sewage systems, which are those lands generally suitable for agricultural or open spaces.

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* SO_2 has also been designated as a pollutant to be carefully watched during the next 10 years (see subsection V.C.5, "Impacts on Air Quality").

In addition to development for human habitation, sewers enable desirable institutions to be established in the area such as colleges and parks.

Sizing of lines, the Plant site and supporting facilities have been designed with a view towards increased growth in the area, but insofar as possible facilities are installed modularly to minimize expense to current population. Expansion of the system is therefore possible, if necessary, but unreasonable current investments in distant future possibilities have not been made. It is felt that the proposed system is sufficiently flexible so as to permit each municipality to exercise its own land use options as it sees fit within constraints of the law.

The facilities provided, sewers and treatment will have basic life spans equal to or greater than the life of the financing period as a whole. Maintenance and replacement of parts will be required but the cost of these are a part of the annual rental.

Based on history it cannot be said that the facilities as initially installed will not undergo major changes during the financing period. Continuing upgrading of treatment requirements may dictate additions to the Plant or even its abandonment to a more economical solution at a future date. Major capital additions can result from increased population or expansion of service areas. Again, the facilities to be provided comply with current requirements and provide for the undefined future in terms of system planning.

In recent history interceptor sewers have, like highways, been a factor in causing unwanted development, particularly where such lines pass through scenic undeveloped land. Such interceptors are planned along the Little Valley Creek and French Creeks to convey sewage from remote areas. Although environmental protection has been provided in terms of primary effects by the Authorities, their professionals and regulatory governmental agencies, control of development to preclude destruction of these natural resources is also the responsibility of the municipalities. It is intended that the guidance set forth in this EIS will assist the local officials in planning wisely for future growth and avoiding the kinds of existing conditions that have resulted from inadequate planning efforts in the past.

If a recycling operation for effluent disposal (land treatment) in the future phases of this wastewater program proves to be feasible, aquifers in the Study Area could be continually recharged with pure water, extending the usable life of these potable water supplies and increasing the productivity of crops and vegetation through irrigation.

The short-term adverse environmental impacts of the proposed action will be offset by long-term environmental benefits:

1. The quality of the surface and groundwaters of the Design Service Area will be enhanced due to the elimination of polluting sources (primarily septic tanks), wastes being conveyed to the Plant for treatment and discharged to the Schuylkill River.

2. The quality of the Schuylkill River will be enhanced due to the discharge of a high quality effluent from the Plant which will result in proportionate beneficial effects on water supply, recreation and aquatic biota.

3. The contamination of inland streams and the Schuylkill River from run-off carrying sewage effluent from malfunctioning septic systems will be greatly reduced.

4. The quality of water supplies withdrawn from aquifers will improve.

5. Sludge disposal via landfilling operations will allow the sewer authorities the opportunity to explore landspreading techniques of the conditioned sludge for farmland, pastureland, etc. Successful landspreading operations will eliminate the need for artificial fertilizer and will provide the land with proper nourishment for the growth of crops and greenery.

6. The sewer system and the land use guidance made part of this EIS and the grant conditions in the Supplements will enable the municipalities to update and strengthen their respective comprehensive land use plans, zoning and other development control ordinances and sewage facility plans in order to reflect a more sound environmental approach to land use planning in Chester County.

7. The residents within the Study Area will be able to realize a more pleasing and healthier environment now and for future generations.

F. Irreversible and Irretrievable Commitments of Resources Which would Be Involved in the Proposed Action Should It Be Implemented.

This section summarizes the adverse effects that the proposed project will have on the beneficial use of the environment by permanently committing land, construction materials and biological, human, economic and aesthetic resources.

For purposes of presentation and discussion, all resource commitments have been separated into categories of primary and secondary commitments.

1. Primary Resource Commitments

A primary short-term impact on the aesthetic resource of the area, although not truly irreversible nor irretrievable, is the potential removal of some established trees and other flora.

The land necessary for the Plant and pumping station sites will prevent any other land use for the life of the project. The rights-of-way which are not along highways will restrict land use across them to agricultural, recreational or open space. The Plant and pumping station sites other than as described elsewhere will be lost for any other significant uses. The lands will represent lost revenue to the municipalities as most of the lands are now taxable.

The labor required to construct the facility and operate it is an irreversible commitment.

Materials and natural resources required will include concrete, steel, wool, clay and asbestos compounds for the construction of the structures and the pipe lines, and seeds and plants will be required for landscaping all of which will be consumed irreversibly.

The operational phase of the facilities will require approximately 550 lbs/day of chlorine, 33 to 65 lbs./day of polymeric flocculants, sand for the filter, no. 2 fuel oil for heat and air conditioning and fossil fuels to generate the approximate 6,500 KW peak needed to operate the entire system.

Also irretrievably committed for the life of the facilities are the potential mineral resources that are in the area occupied by the project facilities, particularly the brick clay upon which the Plant will sit. (As mentioned before, this particular resource is plentiful.)

The operation of the Plant will essentially divert 8 mgd of water away from the Study Area into one point of discharge on the Schuylkill River. This resource is not committed irreversibly to the River. Should the water be needed in the future, it would still require treatment essentially to the degree provided or greater. Only small relative costs are committed to the outfall pipes. Pumping processed water for other uses such as the beneficial effects derived form spray irrigating all or part of the effluent on open land is possible in the future.

If we call the aesthetics of the environment and its serenity natural resources, then these qualities may be irreversibly affected with the implementation of the Plant and pumping stations. Depending on the individual point of view, there may be an irreversible potential loss of aesthetics connected with the appearance of the aboveground structures. The serenity of the environment may also be affected somewhat due to the potential noise and odors associated with operation.

2. Secondary Resource Commitments

All the secondary irreversible and irretrievable commitments of resources are a direct consequence of potential new developments associated with new sewers, new highways and new potential energy supply. When population grows, land must be developed to provide the homes, schools, stores, offices and other things people need.

If these developments are going to take place on the aquifer recharge area without proper precautions, there will be an irretrievable loss to the groundwater table due to the decrease in recharge areas. Similarly, if developments through lack of proper zoning regulation enforcement are not allowed to perform their natural functions of storage during heavy rain and aquifer recharge, there would be an irreversible loss of these natural resources.

Along with developments come new roads, new parking areas and associated non-permeable surfaces. As these development trends increase, open spaces and their recreational resources associated with wildlife and aesthetics are irreversibly lost.

Proper implementation of the planning processes to be developed as a result of the grant conditions in the Supplements and this EIS will minimize the consequences of development related commitments of resources.

G. Project Controversy and Public Participation

At the time of preparation of the Draft EIS, there had been formal objections to the proposed action as well as support. Also, there had been suggestions and requests for investigation of alternatives to the proposed action. In response to some items of objection, design plans and specifications have been modified.

Other items of concern were essentially questions relating to costs, ownerships, the interrelationships of municipalities, location of the facilities and effect of these facilities on the environment during and after construction. These questions and others have been of equal or greater concern to the local, state and Federal agencies responsible for the accomplishment of the proposed action.

The following is a list and synopsis of each formal comment or comments received prior to the preparation of the Draft EIS. Appendix 8 contains copies of the original correspondence and petitions and Appendix C contains EPA's responses to the comments on the Draft EIS.

1. Valley Forge Park Commission - During the planning and design stages of the proposed action, the Valley Forge Park Commission expressed concern related to archaelogical considerations and possible disruption of Park activities. The physical location and architectural considerations of a major pumping station originally placed north of the Pennsylvania Turnpike immediately adjacent to the Park property had been the subject of concern. Concern relative to potential population growth in the Valley Creek Basin as influenced by sewage facilities has been subject to the Commission's question, particularly in regard to uncontrolled development which, if permitted, could result in flooding of key Park facilities.

A request was made by the Pennsylvania State Liaison Officer for Historic Preservation and the President's Advisory Council on Historic Preservation that the authorities reinvestigate the location of the Wilson Road pumping station and comply with certain construction and legal requirements.

On October 19, 1972, the Valley Forge Sewer Authority transmitted a proposal to the State Assistant Attorney General, Alan L. Spielman, Esq., which was believed to comply with the requests. At that time, potential alternate locations for the controversial pumping station were offered.

On July 2, 1973, the Park Commission, in resolution, accepted the proposal selecting a pumping station site located south of the Turnpike and conditioned its acceptance of the proposal on the determination of the proposed action being found sound by EPA. EPA acted as mediator in bringing the Park Commission and sewer authorities to the point of agreement. Appendix 6 Exhibit 2 contains copies of relevant correspondence, including the proposal as accepted and the resolution.

2. Letter from Chester Valley Knoll Civic Association, Inc., to Mr. Edward Furia, former EPA Regional Administrator (November 28, 1972) - A petition signed by 320 members of East Whiteland Township supporting a request for an impact statement on the proposed action. Specific questions covered areas to be serviced, treatment plant location, impact of the project relative to conservation, recreation, water supply and costs.

3. Letter from Ad Hoc Sewer Committee (to Mr. Edward Furia - fall of 1972 - A petition to EPA signed by 1,163 persons residing in Willistown Township. The specific questions and points are identical to the Chester Valley Association's petition.

4. Letter form Mr. Harold Roeder, citizen of Willistown Township to Mr. Robert Blanco, EPA Environmental Impact Branch Chief (January 5, 1973) - The letter does not present an objection to the proposed action but stresses the writer's inability to get accurate information on the proposed action at public meetings. A series of 23 questions were presented concerning design provisions, planning provision, site locations, hydrology and economics.

5. Letter from Green Valleys Association, Birchrunville, Pennsylvania 19421 to Mr. Robert Blanco (December 19, 1972) - A letter from a conservation group in northern Chester County suggesting the consideration of spray irrigation as an alternate to conventional waste treatment.

6. Valley Forge State Park Commission (June 30, 1972) A letter requesting an EIS on the effects of the proposed project on the Park.

7. Chesterbrook Conservancy (April 23, 1973) requesting a study be made of the environmental impacts of the proposed development of the tract known as "Chesterbrook".

8. French and Pickering Creeks Conservation Trust to EPA (March 28, 1973) indicating concern as to the environmental impacts of the proposed sewer project on the Chesterbrook tract.

9. Letter from the Chester Valley Knoll Civic Association, Inc., to EPA (February 5, 1973) providing statements in support of its petition filed November 28, 1972.

10. Letter from East Whiteland Township to EPA (December 7, 1972) requesting a meeting with EPA personnel to discuss the Township's specific questions and comments surrounding the proposed project.

11. Letter from East Whiteland Township to EPA (December 26, 1972) providing specific information of concern to the Township to be included as part of the Environmental Impact Statement.

12. Letter from Phoenixville Area YMCA to EPA (May 2, 1973) indicating its approval of the project.

13. Letter from Malvern Borough Planning Commission (July 26, 1973) to Mr. Daniel Snyder, EPA Regional Administrator, expressing concern over their municipal water supply as impacted by the Valley Forge Sewer System.

Following the preparation of the Draft EIS, comments were solicited from Federal agencies, organizations, environmental groups, public groups and individuals. In addition, a public hearing was held on January 10, 1974, to discuss the proposed action and to receive the comments of the public and organizations for consideration in preparing subsequent studies for this Final EIS. A summary of the transcript from the public hearing is included as Appendix D. The full text of each presentation was recorded and is on file in the Region III Philadelphia office, and is available for scrutiny upon request. A 45 day review of the Draft EIS originally scheduled to end on January 21, 1974 was extended to February 12 because of continued requests by the public for more time to read and digest the lengthy document.

Numerous comments were received on the Draft EIS and are included as Appendix B. Appendix C is a comment/response section of the Final EIS which addresses each constructive comment made on the Draft EIS. Individual responses are given when they are so warranted and responses to other comments have been incorporated within the body of the Final EIS.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Introduction

The Townships of Charlestown, East Pikeland and Schuylkill, through the Valley Forge Sewer Authority (VFSA), and the Townships of East Whiteland, Easttown, Tredyffrin and Willistown and the Borough of Malvern applied to EPA, through the Pennsylvania Department of Environmental Resources (DER), for grants to plan and construct intercepting sewers and treatment facilities to provide advanced secondary treatment of their waste waters. The proposed systems would alleviate existing health hazards, prevent surface and subsurface water contamination and with adequate planning of land use and the publicly owned treatment facilities, provide ways to prevent urban sprawl and insure orderly future growth.

In early 1973, conditional grant offers and acceptances were executed by these municipalities which made the grants conditional upon the implementation of such project changes and environmentally protective measures, assurances and regulations as the Regional Administrator of EPA, Region III, determined necessary after a NEPA review of the project.

Work performed in the preparation of the Final EIS for Valley Forge has shown that some surface and subsurface water quality is badly degraded and that by 1980 a violation of one or more Federal ambient air quality standards may occur. Much of the observed environmental degradation has resulted directly from improper land use, uncontrolled development patterns and the failure to coordinate sewer service with uncontrolled growth areas. Moreover, analysis of the composite plans of the eight municipalities in the Valley Forge Study Area indicates that the existing comprehensive plans and land management processes require revision and coordination in order to correct the situation. In short, without review and revision of the comprehensive plans and implementation of the proposed land management procedures to protect environmentally sensitive areas, the mandates of the Federal Water Pollution Control Act Amendments of 1972 (FWPCA) and the Clean Air Act of 1970 will not be realized.

Federal environmental laws set air and water standards to protect public health. In the Study Area this is particularly applicable for water quality, since the Schuylkill River and its tributaries are a source of potable water supply for people in the metropolitan Philadelphia area. This resource has been designated as a water quality segment,* justifying the application of the most stringent controls.

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* 40 C.F.R. §130.11(d)(1) defines water quality segment as "(a)segment where it is known that water quality does not meet applicable water quality standards and which is not expected to meet applicable water quality standards even after the application of the effluent limitations required by Sections 301(b)(1)(A) and 301(b)(1)(B) of the Act."

While EPA, through the EIS process is required to identify and assess both the primary and secondary impacts of the Agency's actions on land use, EPA does not have the authority to dictate exactly how local municipalities should zone or plan. EPA does, however, have the authority to cite violations of the standards designed to protect the public health and to use its wastewater treatment planning and construction grant programs to try, whenever possible, to avoid such problems in the future. In view of the likelihood of continuing growth and environmental degradation in the Study Area, EPA is requiring the participating municipalities to review, revise and coordinate their comprehensive plans and their portions of the 537 Sewage Facilities Plan, as well as adopt certain minimal environmentally protective ordinances, to plan and implement environmentally sound land uses. See Appendix A.

The following conclusions and recommendations are based on the findings contained in the Final EIS which incorporate responses to testimony taken at the January 10, 1974, public hearing, written comments to EPA and meetings with DER and local officials.

Since neither the "No Action" nor "Existing Planning and Zoning with Sewer Service" alternative futures meet air and water quality standards mandated by Federal and state laws, the recommendations are related to only one alternative future, the "Environmentally Sensitive Plan with Sewers." See Section IV, Part III, "Evaluation of Alternative Land Use Patterns" for an extensive description and discussion of these three alternative futures.

B. Geographic Area

1. Use of Natural Service Areas

Conclusions - Although the collective land area of the participating municipalities taken together covers all of the Valley and Little Valley Creek Drainage Basins, it only partially covers the lower reaches of the French and Pickering Creek Drainage Basins and the headwaters of the Crum and Darby Creek Drainage Basins. As noted in Section I.C., several years after receiving the approvals of DRBC, DVRPC and DER and the submittal of the grant applications and project plans to EPA, the Environmental Hearing Board ruled that municipalities within the natural service areas (drainage basins) of wastewater treatment facilities could be required to participate in a single treatment facility. While only the 8 participating municipalities will have construction within their borders, with the exclusion of Phoenixville, development upstream without adequate planning and land use regulations could adversely impact the water quality in these drainage basins.

Recommendations - In future wastewater management planning for the area the total land area in the natural drainage basins (French, Pickering and Valley) and in the headwaters of adjacent drainage basins (Crum and Darby) should be included and the municipalities involved should participate fully to determine if their existing land use regulations within the drainage basins protect and maintain water quality in the affected basins. Phoenixville should also be a full participant in the continuing wastewater management planning process involving review of comprehensive land use plans and updating of 537 plans for the basins.

2. Interface with Regional Planning Efforts

Conclusions - At the time of the conditional grants and preparation of this EIS, regional wastewater management planning of the Schuylkill River Basin was embryonic. Recently, however, DER has retained Betz Engineers to prepare an area-wide wastewater management plan. Among other things, the objective of the plan will be to maintain and improve water quality in the Schuylkill River in the most cost-effective manner possible.

Recommendations - Future land use and wastewater management planning should interface with macro-scale planning for the Schuylkill River Drainage Basin utilizing data and analyses generated by sub-regional planning work, taking maximum advantage of possible future savings in sewage treatment costs generated by the larger regional approach.

C. Protection of Environmentally Sensitive Areas Through Land Management Ordinances

Conclusions - Environmentally sensitive areas represent those geographic areas whose natural processes, when disturbed, incur direct and/or indirect environmental, social and economic costs. These areas consist of surface waters, marshes, floodplains and impoundment areas, acquifer recharge areas, steeply sloping land, forests and woodlands, agricultural lands, wildlife habitats, recreational areas, sensitive geologic conditions, and archaeological and historic sites. Many of these sensitive areas in the Study Area are protected by municipal ordinance, but this protection is uneven and sporadic among existing land management ordinances. Several of these land management practices should be uniform throughout the Study Area and equally enforced, including flood plain protection, stormwater management, erosion and sedimentation control and soil and subsoil type controls - all specifically dealing with water quality.

Recommendations -

1. Flood Plain Management

Flood plain management programs have already been adopted by several of the municipalities; several other municipalities are in the process of applying for participation in the Federal Flood Insurance Program; and all the other municipalities have been initially designated by the Commonwealth of Pennsylvania as containing "flood prone areas." All those that have not already done so should and therefore have been required to apply for the Federal Flood Insurance Program and adopt flood plan management programs to provide adequate safeguards against flooding conditions. These measures are to be taken by December 1, 1974.

2. Stormwater Management

A system of stormwater management should be established to provide safe and sanitary surface drainage to protect surface and subsurface water quality. A sound program in force reduces the danger of floods from rapid run-off of surface waters from developed areas. It also permits and encourages land use compatible with the natural flow and retention of stormwater and the preservation to the greatest extent possible of natural vegetation and marshes which retain stormwater on the land.

Much of the flood hazard is directly related to the process of urbanization. With development, impervious areas, buildings, parking lots, roads and sidewalks replace vegetative cover and increase stormwater run-off. Currently, stormwater run-off designs concentrate and accelerate delivery of the increased run-off to points of discharge which in turn results in a reduction in the groundwater table (a lack of natural percolation of stormwater) and jeopardizes maintenance of stream low flows in the Study Area. Stream low flows are also adversely impacted by removal of on-lot sewage disposal facilities which replenish and augment sub-surface wastewater recharge of groundwater. Establishment of on-site stormwater management procedures directed at holding stormwater on-site after development, recharging groundwaters and releasing the remaining stormwater slowly to avoid increased flooding and resulting loss or damage to property has been recommended, and the adoption of ordinances to accomplish this has been required by the end of 1974.

3. Erosion and Sedimentation Controls

Woodlands, steep slopes and other areas undergoing development need protection to prevent damage to adjacent streams and bodies of water from the excessive quantities of soil eroding from development areas. Such soil erosion necessitates costly repairing of gulleys, washed-out fills and embankments, sediment production that tends to clog sewers and ditches and to pollute rivers, streams, lakes and reservoirs. Sediment also limits the use of water and waterways for most beneficial purposes, destroying fish and other aquatic life and is costly and sometimes difficult to remove. In addition, sedimentation reduces the channel capacity of waterways, resulting in increased chances of flooding. The adoption by December 31, 1974 of local ordinances to apply and implement DER's requirements as formulated in the Erosion Control Regulations (Title 25, Part I, Subpart C, Article II, Chapter 102) has been required.

4. Basic Natural Features Protection

Two basic natural features impacting future urban development in the Study Area are soils and limestone formations. These features determine the practicality of on-lot sewage versus land requiring public sewage service. The potential danger of subsidence in the limestone areas require special precautions to be used by the municipalities affected. These natural constraints on development should be translated into ordinances or other actions to assure that development will follow this distinction between on-lot and public sewage service. Some essential steps to be taken include:

(1) Designation of areas to be sewered based on an analysis of the chemical and physical properties of the soils presented in this EIS.

(2) Implementation of special measures to protect these limestone aquifers and provide adequate sub-surface analyses of foundation conditions before permitting construction.

5. Agricultural Land Preservation

Large areas within the Study Area are classified as Class II and Class III agricultural land suitable for intensive cultivation. Measures should be taken to preserve this valuable resource. Certain portions of these remaining prime agricultural lands should be preserved for the production of crops or use as pasture. Methods to preserve these prime lands range from reduced real estate assessments under Pennsylvania Act 515 (covenant between owner and county for non-development for certain period of time) to a system of transferable development rights under which farm owners sell their development rights (not their property) to a developer who uses these development rights to build higher densities in the urbanized areas of the municipality. In the planning review, each municipality should determine which areas should be retained in low density or agricultural use and the best methods to fulfill that objective.

6. Protection of Valley Forge State Park

a. General

Facilities to be built in or nearby Valley Forge State Park will be constructed in such a manner so as not to have an adverse effect on the National Register property. Construction methods to be implemented by contractors engaged in this work will be in accordance with the provisions enumerated in Section V.C., "Environmental Impact of the Proposed Action" and VFSA's proposal, which was adopted by the Valley Forge State Park Commission (see Appendix 5 Exhibit 2). In addition, architectural approval authority has been given to the Commission on all buildings on or near Park property.

The upcoming Bicentennial Celebration, scheduled to commence in 1976, is expected to attract many thousands of people to this historic site. Consequently, it is necessary that proper sewage facilities are operating at that time to provide a much needed service to the Park.

Therefore, it is strongly urged that construction schedules be modified to allow immediate construction in the Park so that any rehabilitation necessary to restore the areas to existing conditions can be satisfactorily accomplished before the commencement of the Bicentennial.

b. Flooding of Washington's Headquarters

The Valley Forge State Park Commission has expressed concern over the fate of the Washington Headquarters Building as it relates to future increased dangers of flooding resulting from further urbanization of the Valley Creek Drainage Basin.

A study was conducted by DER at the Commission's request and the findings have been presented under Section II.B.6., "Hydrology". EPA generally agrees with the conclusions drawn by DER which state that flooding of the Headquarters Building is expected under fully developed conditions (12% impervious cover; 10,800 cfs flow rate) of the Valley Creek Drainage Basin and simultaneous flood stages of both Valley Creek and the Schuylkill River.

However, EPA observations have further concluded that the primary reason for the flooding of the building would probably be the resulting effect of a flooded Schuylkill River "backing" up the mouth of Valley Creek, causing the Creek's waters to rise. Valley Creek at the peak flood stage would probably not inundate the building by its own actions. Therefore, it is more than likely that the Schuylkill River at flood stage, with or without a flood stage on Valley Creek, would result in flooding of Washington Headquarters caused by the backwater effect.

Recommendation

The guidance set forth in this EIS regarding Stormwater Management (Section VI.C.2) should be used to establish such a program to provide safe surface drainage to surface waters. The Valley Creek Drainage Basin has been pointed out as one such area in which measures should be implemented immediately.

With respect to the Schuylkill River, it is strongly urged that on-site stormwater management procedures be implemented for all new development as well as initiating such a program for existing built up areas that presently contribute to the flooding levels of the River. Without such a program, it is expected that Washington's Headquarters will be inundated unless it is somehow physically protected.

The Valley Forge State Park Commission has expressed continued concern over the fate of the Park as it may be impacted visually and aesthetically, as well as by flooding, by development constructed on adjacent lands. Pending before the Conservation Committee of the Pennsylvania House of Representatives is House Bill No. 2134, entitled "Natural, Scenic, and Historic Areas Act". Essentially the Bill, if enacted, would provide authority to DER to prohibit any development in areas "surrounding, adjoining, or contiguous with" Federal and State parks and historic areas should that agency so desire and determine that such action was necessary to preserve the park or historic area. If the Bill is adopted, DER and the suprvisors of the participating municipalities may wish to apply this protective procedure to undeveloped areas adjacent to the Park.

D. Air Quality

Conclusions

Although it is anticipated that the Federal Motor Vehicle Control Program (FMVCP), along with continual updating of vehicle population, will result in successive decreases in annual emissions of hydrocarbons, it is apparent that additional control measures will be required to attain national ambient air quality standards as expeditiously as practicable and thereafter to maintain these standards.

Recognizing that the control measures originally included in the State Implementation Plan were inadequate to insure maintenance, particularly for pollutants resulting from general urban and commercial development, the Administrator of EPA promulgated regulations (39 Fed. Reg. 25291 (July 9, 1974) which require review procedures for all indirect sources (e. g., shopping centers, sports complexes) which are those types of facilities which induce a quantum increase in mobile source activity. In addition on the following day the EPA Administrator required Pennsylvania to analyze the impact of air quality of projected growth in 12 proposed areas, including the Sourtheast Pennsylvania Air Basin, of which the Study Area is a part, which areas EPA believes may have the potential for exceeding one or more national ambient air quality standards within the next ten-year period as a consequence of current air quality and/or the projected growth rate of the area (39 Fed. Reg. 25330 (July 10, 1974)).

Since air quality analyses in the Study Area indicate a probable violation of photochemical oxidant standards and potential violations of particulate and possibly carbon monoxide and sulfur dioxide standards, it is evident that the above regulations will be needed to attain and maintain national ambient air quality standards in the Study Area. It is essential that such measures as the indirect source review and the air quality maintenance plan, which are designed to improve public health and welfare, be incorporated into comprehensive state and local planning processes.

Recommendations

Analysis of air quality data and emissions projections for hydrocarbons and particulates, and to some degree carbon monoxide and even sulfur dioxide, indicates that uncontrolled growth in the Study Area may well lead to violations of national ambient air quality standards for one or more of these pollutants.

In order to assure maintenance of ambient air quality in the Study Area, it is recommended that:

(1) Construction of major new point sources of hydrocarbons and/or particulates (and possibly sulfur dioxide as well), which are not required to meet "standards of performance for new stationary sources" under Section 111 of the Clean Air Act of 1970 because the standards are not yet promulgated, be required to install best available emission control technology or, if even that would be insufficient, be prohibited in appropriate instances.

(2) Permits for construction of major new indirect sources be withheld until January 1, 1975, when EPA's regulation for review of indirect sources becomes effective.

(3) The guidelines contained in Section VI.H , "Land Use Planning" be incorporated in individual municipal comprehensive planning processes.

E. Water Quality

1. On-Lot Sewage Systems

Conclusions

Suburban communities since World War II have relied almost exclusively on on-lot sewage systems to dispose of residential, commercial, industrial and institutional wastewater. In addition, when on-lot systems malfunctioned or failed, suburban communities found justification for larger and larger lots. These two related suburban land development policies have contributed heavily to the scattered growth pattern, underutilization of land and degradation of water quality, not to mention the enormous costs of providing sewage facilities to service this so-called urban sprawl.

The extent of the problem and soundness of the suburban policy can be measured by estimating the number of malfunctioning sewage systems in the Study Area. It was found that municipalities which submitted estimates were reporting on the average ten times the number of malfunctions reported by the Chester County Health Department which recorded only complaints filed or permits requested to repair or replace a system. Using municipal records where available and multiplying County Health Department values by a factor of ten, it was conservatively estimated that of the 13,956 residences in 1970 in the eight municipalities to be provided sewer service in the Study Area by the project, 3,852 experienced malfunctions of on-lot sewage systems. Of these roughly 86% would be provided sewer service by the project.

When on-lot sewage systems malfunction, the remedy is usually to pump out the septic tank to permit continued operation. At present there is no monitoring or control of these commercial pumpers by the municipalities and too often the septic tank waste is discharged into streams, creeks or on the land instead of into a wastewater treatment system. Lack of control by the municipalities accounts in great measure for the lack of adequate data in quantifying malfunctions and volumes of septic tank waste pumped. Ordinances establishing a permit program have been adopted in other townships, in suburban Philadelphia, such as Radnor Township in Delaware County.

While this estimated data substantiates the failure of on-lot sewage disposal systems to adequately treat wastewater, it should be noted that it does not report on the entire problem. Many of the systems in the Study Area are located in the limestone areas. Although these systems are in fact failing, they generally go unnoticed since sewage seeps down, polluting groundwater and eventually causing subsidence. (See Section II. C. 4, "On-Lot Sewage Systems").

Substantial efforts have been made to improve on-lot sewage system performance. Regulations now call for a determination of the suitability of the soil for use of such systems through percolation rates and test borings in combination with absorption standards for specific wastewater flows. Evidence indicates that use of these standards has not proven dependable over the long-term. Moreover, the Study Area on-lot systems located in areas with unsuitable soil characteristics tend to malfunction even when the systems conform with existing standards. Although sufficient documentation has not yet been compiled to fully rebut the weight of existing soil and absorption standards, DER's regulations recognize that on-lot systems for lots less than one acre cannot be expected to function indefinitely.

In 1971, the Soil Conservation Service (SCS) analyzed the physical and chemical properties of the soils, including depth to bedrock, depth to seasonal high water table, permeability, available moisture capacity and hazard of groundwater contamination. Using these soil variables, SCS classified the soils as "slight", "moderate" and "severe" as to their suitability for septic tank drain fields. The soils in the Study Area classified as "severe" were mapped by EPA and identified as requiring sewers or alternatively if sewers were not planned for the area, very low density, rural or open space should be designated as the appropriate land use. (Section II.B.5).

Recommendations

1. The present land development policies geared to reliance on on-lot disposal of wastewater and inadequate use of land should be replaced by growth and density patterns related to the orderly cost-effective extension of sewer service. See Section VI.H , "Land Use Planning".

2. The soil limitations developed by the Soil Conservation Service should be employed as a determinant of land use and intensity of use (density) in areas not planned to be sewered to insure maintenance of water quality.

3. It is imperative that each municipality adopt a permit program to control and monitor the periodic pumping of septic tank waste from malfunctioning on-lot sewage systems. Such a program should be designed to insure that (a) septic tank waste is discharged into a collection system for conveyance to the plant; (b) payment is made for such treatment; (c) discharge of septic tank waste into streams and on land is prohibited; and (d) a record of malfunctioning on-lot systems is developed to provide an empiric data base on which the performance of the sewer system and justification of ordering service extensions can be based.

2. Package Sewage Treatment Plants

Conclusions

During the last decade, small (package and interim) domestic, municipal, industrial and institutional sewage treatment plants (STP's) have been introduced in the Study Area either to treat existing wastes or permit developers to build at higher densities which generate wastewaters that could not be absorbed by the soils. Lists of these plants were compiled and information where available is given as to design population and maximum and current average flow rates in gallons per day. These lists are not necessarily inclusive.

The flow rates for the industrial and institutional STP's represent gallons per day which will eventually be treated by the proposed treatment system. These flows are in addition to the domestic effluents from the sewered area. Flows for fewer than half of the industrial and institutional STP's listed were available and not necessarily all the largest were included. Based on the partial data, however, it was conservatively estimated that the combined average total flow would exceed 1 mgd in 1973. (Total effluent flow estimates for 1970 and 1985 are presented in Section VI.H.3)

According to the records of DER's Region I office, not one of the interim domestic and municipal STP's has consistently operated in a satisfactory manner. All, at one time or another, have discharged loads of BOD substances, phosphates, chlorides, or other pollutants into receiving waters at levels significantly higher than allowed. Likewise, the industrial and institutional STP's have a similar record plus other violations which often result in streams receiving quantities of substances such as iron, heavy metals, or toxic wastes, as well as the more common pollutants. (Section II.C.6 , "Use of Package Sewage Treatement Plants")

In a survey conducted by DER in 1973, in Valley and Little Valley Creek at sampling stations located at the several STP outfalls, water quality in the upper reaches was described as "marginal" while measurements downstream from the Paoli Industrial Park and the Borough's STP's were found to be wholly unacceptable, with the water in a state of severe toxicity, and high concentrations of heavy metals, organic pollutants and ammonia. The streams showed essentially no life forms higher than bacteria in these areas. The overall picture was that of a river system in serious trouble and levels of industrial effluent treatment which were clearly inadequate. (Section II.C.5 , "Water Quality")

Recommendations

1. Use of all existing domestic and municipal STP's in the Study Area shich are not meeting Federal and State water quality standards should be discontinued and their effluent conveyed to the proposed plant.

2. Proposed residential developments requiring construction of private STP's should be discouraged and if permitted have assurance in community plans that the orderly extension of public sewers will replace the STP's within a reasonable time.

3. Industrial and institutional (those that produce other than domestic wastes) STP's will be required to pretreat wastes before discharge into the sewage treatment facilities. Federal (under the NPDES program), state and local pretreatment standards and schedules will control the level of pretreatment necessary to meet water quality standards and compliance deadlines.

4. Guidelines for operation and maintenance of STP's discussed in Section II.C.6 , "Use of Package Sewage Treatment Plants" should be satisfied until the above recommendations can be implemented.

3. Summary

Conclusions

It is not surprising to conclude that stream water quality in the Study Area seems to be at a critical point. While streams in areas not yet heavily built up appear to be in fairly good condition, meeting DER standards and supporting a variety of fish and other biota, in streams where extensive municipal and in particular industrial establishment has occurred and private STP's are in use, water quality is badly deteriorated. It is quite clear that these latter streams in the Study Area are presently receiving far more waste than they can assimilate and will be unable to sustain any other uses aside from waste assimilation for very much longer. In particular, present STP's do not seem to be capable of reducing effluent to a level which will allow stream quality to be maintained even under current levels of development.

Recommendations

1. Implementation of the preceding recommendations related to "On-Lot Sewage Disposal" and "Package Sewage Treatment Plants" are essential to attain and maintain water quality.

2. Most important is the development of comprehensive land use plans for the Study Area , supported and reinforced by 537 Sewer Facilities Plans which provide for the orderly growth of the Study Area based on the provision of adequate public sewer service.

F. Water Supply

Conclusions

The provision of public sewage service within the Study Area will undoubtedly cause a slight reduction of groundwater table levels and flows to inland streams. Although difficult to evaluate accurately, it is not expected that diversion of septic tank effluent will result in an adverse effect on the groundwater table or groundwater supplies. It is anticipated that the abundant rainfall in Chester County and normal storm water run-off will be capable of replenishing existing aquifers.

From a water supply standpoint, existing wells within the Study Area should be capable of producing sufficient yields of good quality and a noticeable increase in the quality of groundwater supplies should result from the elimination of septic tank discharges. Since a large portion of the Study Area now depends on a privately owned water supply system (Philadelphia Suburban Water Company) for water needs and its current sources are Pickering Creek Reservoir, the Schuylkill River and wells, adequate supplies should be able to meet new demands sufficiently.

Although such is the case for the majority of the Study Area, Malvern Borough, dependent upon its own springs and wells and an emergency tie-in with the Philadelphia Suburban Water Company for water supply may be more severely affected by the diversion of sewage effluent. As pointed out in Section V.C, "Environmental Impact of the Proposed Action", the geological and hydrologic conditions are such that the spring yield in the northern part of the Borough is expected to be reduced. Since these springs contributed approximately 65% of Malvern's existing water supply sources, any substantial depletion in the yield could result in shortages and insufficient volumes to satisfy increasing needs. Moreover, water supply from existing wells within the Borough may not be sufficient to meet future needs of the Borough especially in recognition of the anticipated growth.

Recommendations

1. Open space within Malvern Borough limits should be preserved in order to provide continual recharge to the groundwater table.

2. Planned growth within the Borough should be evaluated carefully as to the effect of new demands on existing and potential water supplies.

3. If Malvern continues to operate independently of private water supply sources, new development within its boundaries should be discouraged until it is determined whether or not the supply of water can adequately meet increased demands. In addition, it is strongly recommended that Malvern initiate its 5-year water system improvement program as soon as possible.

4. If the attitude of the Borough officials change with regard to negotiating with Philadelphia Suburban Water Company for permanent tie-in status, it is recommended that additional consulting services be retained to estimate the value of the existing water supply. Financial assistance for such an undertaking or any relevant studies may be available primarily under the Farmers Home Administration and the Pennsylvania State Revenue Sharing Office.

G. Treatment Facility Techniques

1. Sludge Disposal

Conclusions

As originally designed, incineration was the proposed method of sludge disposal. Due to the cost of building and operating incinerators and the status of ambient air quality in the Study Area, EPA encouraged the applicants to investigate other means of sludge disposal. Consequently, the Knickerbocker Landfill in East Whiteland Township has made landfilling a feasible alternative for disposal. (see Section IV, Part II, D, "Structural Alternatives").

Recommendations

Although sludge disposal via landfilling is a more sound method for VFSA's disposal of sludge as compared to incineration, it does not compare favorably with the potential economic and environmental benefits to be derived by landspreading the sludge on farmland or strip-mined areas. This becomes a distinct possibility once industrial wastes are pretreated before being transported to the municipal treatment facility.

Since the landspreading of sludge would lower costs and make beneficial uses of the organic, nutrient and water constituents of the sludge, it is recommended that the participating applicants continue to consider and explore landspreading techniques for sludge disposal, especially in light of the abundant farmland areas within the Study Area.

2. Spray Irrigation

Conclusions

An extensive discussion and evaluation of spray irrigation alternatives has been presented under Section IV, Part II, "Structural Alternatives". As this section points out, the soils in the area of the proposed Plant vary in their suitability for spray irrigation due primarily to questionable drainage and depth of soil. Before positive benefits can be derived by adopting such a method of effluent disposal, detailed studies and subsurface explorations must be conducted.

Even though suitable small tracts have been identified for spray irrigation purposes, the approximately 2,600 acres needed by the proposed Plant should be, if at all possible, located in one tract near the Plant. Although Region III, EPA, has had limited first-hand experience in the spray irrigation process, DER has concluded that the subdividing of the system or land areas has resulted in high operational and maintenance costs in addition to considerable "down time" for repairs.

Recommendations

Since spray irrigation has proven to be successful on a small scale under desirable conditions and the benefits to be derived outweigh those of surface water discharge, it is recommended that the participating applicants, with the assistance of the Green Valley's Association, Mr. Marshall Hawes and the Chester Valley Sportsmen's Association, continue to research and explore the actual feasibility of adopting a spray irrigation system in the future for all or a portion of the Plant's capacity. Certainly, the ongoing study by the Valley Forge State Park Commission of the possibility of spray irrigating portions of the Park after pretreatment of industrial and noxious wastes are accomplished should not be overlooked. It is hoped that the guidance set forth in this EIS will provide a basis upon which further studies can begin. In addition, the Plant could easily be modified at a later date to install the necessary facilities for a spray irrigation system.

H. Population and Economic Growth

Conclusions

Northeast Chester County has grown, and will probably continue to grow, at a faster rate than the remainder of the County. These growth rates as pointed out by the Chester County Planning Commission result from (1) high levels of accessibility by highway and transit; (2) large employment centers located in and nearby the area; and (3) the general suitability of the land within the Study Area for development.

1. Municipal Populations in Statistical Study Area

The following table presents 1970 municipal populations and DVRPC's projections for 1985 and 2000 for the Statistical Study Area. These municipal populations are allocated to three drainage basins, the first two flowing into the Schuylkill River and the third flowing into the Delaware River.

TABLE VI-1

MUNICIPAL POPULATION BY DRAINAGE BASIN FOR STATISTICAL STUDY AREA[1]

Drainage Basin	1970	1985	2000
French/Pickering[2]/Stoney	20,224	28,189	37,585
Valley [2]/Trout	29,473	41,481	53,490
Ridley/Crum/Darby	23,678	32,659	41,665
Total	73,375[2]	102,329	132,740
Growth		(28,954)	(30,411)

[1] Source: Table III-10

[2] See footnote in Section III.D.1 , "Sub-Regional Projections".

2. Population in Study Area

The "Study Area", defined by natural drainage basins which are the functional land management units in planning for wastewater collection and conveyance, does not include each municipality in its "Statistical Study Area" in its entirety; See Figure III-2. Using 1970 U.S. Census block data and apportioning population based on built-up areas where block data was not available, 1970 population was allocated to each sub-drainage basin within the Study Area. It should be noted that the Stoney Creek, Trout Run and Ridley Creek Drainage Basins have been dropped since they are not included in the Study Area.

TABLE VI-2

STUDY AREA POPULATION BY DRAINAGE BASIN[1]

Drainage Basin	1970	1985	2000
French/Pickering	10,855	17,344	23,478
Valley	16,988	28,719	39,773
Crum Darby	15,945	23,201	30,045
Total	43,788	69,264	93,296
Growth		(25,476)	(24,032)

[1] Source: Table III-12

The future population growth shown in Table VI-2 was likewise based on DVRPC's projections and assumed to distribute in a similar manner to the 1970 distribution except in the case of Tredyffrin. The majority of Tredyffrin's population lives on less than half the land located in the substantially developed Trout Run Basin, which is already sewered and not included in the Study Area. Most of the new growth (estimated at 75%) will locate in the Valley Creek Basin in the Study Area.

DVRPC's projections on which both these population analyses are based were developed on a county level and then allocated to the individual municipalities in each county. Like all population projections or estimates, the smaller the land area or political unit chosen for estimation, the higher the risk of error. Most important, DVRPC's county projections and subsequent allocations to municipalities did not include the availability or non-availability of sewers as a variable affecting growth or distribution of new growth. (Section III.D 1 , "Sub-Regional Projections").

These projections are based primarily on past growth trends which foresaw continued dependence on on-lot sewage disposal and occasional use of package sewage treatment plants. As a result, the forecasts only present the future growth under the "No Action" alternative. The proposed project will accelerate the rate of population and economic growth in the area where service is provided. While the degree to which this will happen is unclear, it seems reasonable to expect a 10% increase in the rate of growth over DVRPC's population projections for the Initial Service Area. By the time the Design Service Area is sewered, the growth rate could very well have dropped back to the original projections since by that time other land within the metropolitan area would also be sewered. See Section V.C.11 , "Impacts on Land Use", paragraph a.5.

While the population distribution shown in Table VI-2 provides a reasonable statistical forecast by major drainage basins and municipalities for the Study Area, it does not reflect the possible acceleration of growth in the service area, nor does it reflect what might well occur in the alternative future "Existing Planning and Zoning with Sewer Service" (Section IV, Part III,B). In particular, this forecast does not necessarily represent the distribution of population for the "Environmentally Sensitive Plan with Sewers" (Section IV, Part III, C). Under this alternative the distribution and location of both population and economic activities should be based on the ability or holding capacity of the environment to sustain the development and not on a mathematical distribution of growth among the municipalities based primarily on past trends. (Section IV, Part III, "Evaluation of Alternative Patterns")

3. Effluent Flow Estimates 1970, 1985

Two different methods were employed to determine the volumes of effluent flows which would be generated by these population increases and associated development. In estimating these flows the percent of projected population to be served and the volume and percent of industrial, commercial and institutional wastewaters to be treated must be considered.

One estimate, prepared cooperatively by the consulting engineers of the Valley Forge Sewer Authority and the participating municipal sewer authorities, employs the population projections for the Statistical Study Area summarized in Table VI-1. The equivalent population to be served in 1970 is based on estimates of population served plus estimates of other wastewater generated in the Study Area. These amount to an equivalent total population of 37,587 or 3.76 mgd estimated flow. (See Table III-9). The 1985 design capacity of the treatment plant was determined by totalling the estimated 1985 effluent flows prepared by the consulting engineers employed by the participating municipal sewer authorities. These individual flow estimates total 7.53 mgd. (See Table V-1, "Capacity Allocation for Each Municipality".) These capacity allocations form the basis of the allocation among the constituent municipal authorities expressed in the November 1, 1970 interauthority agreement.

The second estimate was prepared as an independent check by EPA. Population forecasts used were those summarized in Table VI-2. Total effluent flows were based on assumptions of population served and volumes of other wastewaters requiring treatment. (See Tables III-12 and III-13 and Sections III.D.2 and III.D.3.). As noted in the text in each component determination the most conservative view was taken. A comparison of the results of these studies is as follows:

TABLE VI-3

COMPARISON OF EFFLUENT FLOW ESTIMATES FOR VALLEY FORGE SERVICE AREAS

(in mgd)

	Initial Service Area (1970)	Design Service Area (1985)
VFSA Consulting Engineers	3.76[1]	7.53[2]
EPA[3]	4.08	7.03

1. Based on Table III-10, col. 3, "Estimated 1970 Equivalent Population to be Served."
2. Based on Table V-1, "Capacity Allocation for Each Municipality."
   Note: Table III-11 "Population to be Served by Valley Forge Sewer Authority" computes only the population component, excluding industrial, commercial and institutional effluent flows; therefore it cannot be used as basis of estimating total effluent flows.
3. Based on Table III-13, "Flow Estimates 1970, 1985 Valley Forge service Areas".

NOTE: Other than inclusion by way of general population growth projections, this table does not include allowance for Chesterbrook in Tredyffrin Township (1.1 mgd), Westgate in East Whiteland Township (1.0 mgd) or any other identifiable pending major development. The approval of these projects and their use of the sewage facilities remains to be determined (1) by the affected municipality and (2) to the extent, if any, that any municipality would require additional flow to accomodate such development, by all the municipalities under their Intermunicipal Agreement allocating capacity among each other.

Both analyses show "Equivalent Population to be Served." As indicated in this Final EIS, additional data has been collected on sewage flows from package treatment plants and a more detailed inventory made of industrial establishments in the Study Area (Section III.D.2) A large part of the differences between the two estimates, especially for the year 1985, are attributable to sewage effluent demands of non-residential uses.

Recommendations

The provision of less than 8 mgd capacity for the treatment plant would not be prudent.

Since the Initial Service Area is designed primarily to provide relief for existing health problems in existing developed areas, revised comprehensive land use plans and 537 sewage facility plans should be completed as soon as possible to guide development in the Design Service Area to meet projected 1985 sewer service demands.

I. Housing

Conclusions

The issue of housing is central in evaluating the impact of wastewater treatment facilities in the Study Area. Housing is estimated to contribute 75% of the wastewater to be treated in 1970. Perhaps more important, future housing will be directly impacted by the project as to density and location. Sewer assessments and annual sewer rentals will affect every resident and could adversely impact low income residents. Finally, it could affect the future costs of housing.

In 1970, there were 25,024 dwelling units in the Statistical Study Area, one-fourth of which were rental units. Analysis of this housing showed a very tight housing market (a 1970 vacancy rate of only 1.6%) and continued heavy demand increasing the value of owner-occupied housing more rapidly than inflation and forcing rents up at twice the pace of inflation from 1960 to 1970. (Section III.A.1)

Multi-family housing, including high and low rise apartments, garden apartments, and condominiums and townhouses dominated new housing construction and resulted in an explosive growth in this type of high density housing in the Statistical Study Area. Some of the reasons given for this significant shift away from single family tract housing were social changes, including shrinking family size, present low birth rates, older single or married couples who no longer wished to live in the "big old house" with its burdens, and out migration of blue and white collar jobs. In addition, economic changes are impacting the supply of housing, including high costs of mortgage money, land, and tremendous increases in construction and public improvements, including sanitary sewers. These latter factors have resulted in low and middle income families being priced out of the single family housing market. Accordingly, the only way to meet housing needs in the suburbs appears to be through construction of multi-family housing (Section III.A.2).

Analysis of residential subdivisions under review by the municipalities in the Statistical Study Area as of June, 1973, revealed that multi-family housing dominates residential construction. Of the 7,250 dwelling units currently proposed 85% consisted of townhouses and apartments and only 15% in single family homes. More basic are the facts regarding land consumption. Of the 1,654 acres involved in these proposed residential developments, only 28% of the acreage would be committed by the multi-family, high density housing, while 72% would be consumed by the low density single family units. (Section III.C)

The future projected growth in population between 1970 and 2000 of roughly 50,000 persons can be translated into housing units by dividing this growth population by the average family size of 3.16 projected by DVRPC for Chester County in 1985. This calculation yields a projected housing demand for the 30 years of 15,820 dwelling units. If 85% of these dwelling units were in row houses and apartments and 15% in single family tract housing, the former at the densities reported in 1973 would consume only 1,011 acres (13,447 units x 13.3 units/acre), and the latter would consume three times as much, namely 3,085 acres (2,730 units x 1.13 acres/unit), a total of 4,096 acres.

Conversely, if single family tract development were to prevail at a density of 1.13 acres per unit, to satisfy the entire housing demand, 17,880 acres would be consumed by the year 2000 for housing alone. This land policy if pursued would utilize 38% of the Study Area (17,880/47,055) by 2000. In addition, the costs of providing sewer service obviously would be exorbitant if not prohibitive. It would be a land pattern that could not be served by transit and air quality would suffer.

In addition to issues related to land consumption, the pattern of housing development, especially if multi-family housing is encouraged, becomes crucial in maintaining air and water quality.

Analysis of subdivisions in the Study Area reviewed by the Chester County Planning Commission from 1969 to April, 1973, revealed that trends during this period showed "a very much more random scatteration of proposed development... which... do not seem related to any major community facilities, particularly the county sewerage plan, major highways, or commuter rail facilities, not to mention the need to preserve farm land." (See Section III.C.)

Recommendations

Guidelines to avoid the impact of this pattern of development on the environment are discussed under "Recommended Guidelines for Comprehensive Planning" at the end of this final section of the EIS.

J. Comprehensive Land Use Planning

Conclusions

Under the laws of the Commonwealth of Pennsylvania, the municipalities have the primary power in zoning and land use control. Accordingly, the comprehensive planning process has largely been performed by the municipalities in the Study Area.

Today, the concept of achieving environmental quality and improving the quality of life mandates that land can no longer be considered only as a commodity but must be viewed as a finite and valuable national, state and local natural resource. Within this context, local governments should now expand their role in planning from that of facilitating unrestricted private development to that of imposing such environmental controls on land use as are necessary in order to protect the public interest (Section III.E.1).

Not only does FWPCA support this view, but so also does Article I §27 of the Pennsylvania Constitution which provides that the people have a "right to clean air, pure water and to the preservation of natural, scenic, historic and esthetic values of the environment... for... all the people, including generations yet to come...."

In the Study Area, although there has been a long standing interest in land use planning and protection of community values, an analysis of existing comprehensive land use plans revealed an unequal consideration among the municipalities towards air and water quality maintenance and management of land to protect environmentally sensitive areas (Section III.E.2).

In general, observing recent development patterns produced under past planning controls and analyzing the implications of present comprehensive plans on future development, the following criticisms appear valid:

- Random patterns of development based on absorption of wastewater by soils and practiced since urbanization replaced local farms, has left a land use pattern virtually impossible to sewer economically.

- Low density residential (lots of one acre or more) growth mixed with industrial, commercial and institutional development requires large runs of underutilized and, therefore, non-assessable pipes.

- Residential developments either at densities requiring public sewer service or on soils unsuitable for on-lot sewage disposal are proposed in areas which will not be sewered by the current sewer project.

- Violation of the ridge lines of natural drainage basins by all forms of development needing sewers requires pumps and force mains which increase both capital and operating costs.

- Large industrial, commercial and office areas providing high future employment concentrations, are planned as totally dependent on auto and truck access; induced vehicle miles of travel (VMT) resulting from these complexes can degrade air quality.

- The siting of these employment concentrations also fail to relate to sewer service, creating a dependence on package treatment plants which have in the past been unreliable and degraded water quality.

- As noted by the County Planning Commission, there was an inadequate amount of land designated in plans to meet the needs of multi-family housing. Failure to provide adequate land for townhouses and apartments forces builders to develop high density housing unrelated to sewer and transit service thus assuring further degradation of water and air quality.

In each municipality's review of its existing comprehensive land use plans, future Federal policy on grants for sewer facilities will have an impact on the patterns and the density of land use and the phasing of development. Thus these following points dealing with economics have a direct bearing:

- Federal grants for sewer facilities are made available to correct surface and sub-surface water pollution. The law, however, is not intended to provide continuing government subsidies for future development, since FWPCA precludes EPA from financing collection sewers that serve areas where two-thirds of the development was built subsequent to the passage of FWPCA on October 18, 1972. In short, it is the responsibility of local governments to insure that land use patterns can be sewered economically in a cost-effective manner which insures continuance of reasonable annual sewer rentals without continued Federal grants.

- Nothing in the Federal or State Constitutions requires a public service such as sewers to be provided to make land profitably usable. If a developer buys land and obtains a change in zoning, permitting high-density development which requires the extension of uneconomical sewer service, the increased sewer costs not only fall on the new users in the development but also on all who are already served by the system.

Recommended Guidelines for Comprehensive Planning

In most of the municipal plans, the prime objective was "to keep service costs down" and "to build a tax base". In the following recommended guidelines to achieve air and water quality, the costs to the individual taxpayer in the Study Area is of prime concern. Recommended guidelines dealing with keeping future sewer costs down to the resident are followed with specific guidelines on attaining and maintaining air and water quality. These recommendations can be applied to both land management techniques to protect environmental quality and employed by the citizens and officials in the review and if necessary revisions to their existing comprehensive plans, land use control ordinances and 537 sewer facility plans.

1. General Guidelines

General guidelines for use in planning land use patterns to attain and maintain air and water quality include:

a. High density urban development, including residential, commercial and industrial, should be located along existing and proposed transit service corridors. Primary emphasis should be placed on rail transit at station locations and secondary consideration given to land uses served by feeder bus service. Reliance on transit to satisfy travel needs increases the use of the least polluting people movers and decreases reliance on the auto. Pursuit of such public policy also makes individual families and establishments less vulnerable to fuel shortages.

b. This pattern of development is advocated by the Chester County Planning Commission and DVRPC. More importantly, it provides a developmental pattern which can be cost-effectively sewered, minimizing capital investment and insuring lowest possible annual sewer rentals.

2. Guidelines for Sewer Service

a. Provision of sewer service to land in the Study Area will increase its value significantly thus providing greater tax revenues. Opportunities also will be afforded to amend local plans and ordinances to develop and redevelop worn, unsightly or underutilized areas of the community. Thus, land, especially if densities of use are increased, will yield greater tax revenues even after service costs are deducted. Tredyffrin Township's analysis of revenue versus service costs substantiates this point (Section IV, Part III,D).

b. Based on careful engineering, cost and environmental analysis the present planned residential densities should be compatible with (1) soil characteristics and underlying geologic structure, (2) if sewers are to be provided, the density of residential use should be increased to permit cost effective sewer service, and (3) if sewers are not to be provided, the density of residential development should be reduced to insure the public that extension of uneconomical service will not be required at some future date. The impact of providing sewer service, therefore, could be to both increase densities in areas served and reduce densities elsewhere.

c. In those areas which are planned for the preservation of land for farm, forest, water supply or open space use and which are not planned to be provided sewer service, land values will increase at a slower rate than land in the Initial and Design Service Areas, and might require use of Act 515 (or some other device) as an economic inducement to achieve planned objectives.

3. Guidelines to Maintain Air Quality

a. The review and evaluation of the municipal comprehensive land use plans should be designed to maintain air quality. Since the principal source of several important air pollutants are mobile emissions, the patterns of development should be designed to reduce VMT. To accomplish this objective, transit (rail and bus) must be given a dominant role in determining the location of high-density residential, commercial, institutional and industrial uses that generate large trip volumes. Location based on transit service permits transit, the least polluting mode, to satisfy the maximum share of the total travel demand, thus reducing VMT.

b. The corridor pattern of development, endorsed by the Chester County Planning Commission and DVRPC and historically the development pattern in force in many of the municipalities, is not adequately reflected in local plans. Moreover, there is growing evidence that dense urban uses totally dependent on road access are diluting the corridor scheme. Consideration should be given to providing high density land uses at rail stations located on both the Penn Central (Mainline) and Reading (Schuylkill) lines. For residential development, densities could run as high as 10 to 25 dwelling units per acre.

c. VMT and thus mobile pollution sources can be reduced by adopting a development policy that leads to a balance between employed and resident labor force. Implementation of DVRPC's Regional Housing Allocation Plan 1970 - 2000 and subsequent allocations to sub-regions in Chester County could therefore support maintenance of future air quality in the Study Area.

d. Plans of the municipalities should be reviewed to insure that new land uses which induce substantial increases in vehicular traffic ("indirect sources") are discouraged.

4. Guidelines for Coordinated Land Use Planning Implemented by Appropriate Ordinances and Revised 537 Sewage Facility Plans

As specified in the amended Grant conditions (Appendix A):

a. each municipality will review and revise as necessary its comprehensive land use planning effort to insure that the growth inducement effects of the new sewer facilities are taken into account and that the revised plans are consistent with Federal, state and local environmental regulations such as Federal and state air and water quality standards and the Pennsylvania Constitutional Amendment on Environmental Rights. During the following review and revision of each comprehensive land use plan, coordination of these eight plans will be achieved through a formally instituted planning group with representation for each municipality and the Chester County Planning Commission. Additionally, public hearings and review and comment by DER and EPA will be accomplished prior to final plan approval by each municipality.

b. each municipality will then adopt and administer whatever ordinances are necessary to implement the revised comprehensive plan.

c. each municipality will then revise its portion of the 537 Sewage Facility Plan to be consistent with the revised comprehensive plans and to set out a pattern of orderly community development. Revised 537 Plans will be locally coordinated and submitted to DER for approval.

* * * * * * * *

By following these procedural guidelines and the substantive recommendations contained in this Section of the EIS, the participating municipalities will have formulated plans which respond to local and regional resources and needs and allow future growth to accommodate rather than degrade the environment.

GLOSSARY

The following terms and acronyms appear frequently in the Environmental Impact Statement. These terms are presented in alphabetical order and have been simplified, rather than giving a highly technical definition.

TERMS

activated-sludge process - use of biologically active sewage sludge to hasten the breakdown of organic manner in raw sewage during secondary treatment.

air quality control region (AQCR) - a designated geographical area, based on jurisdictional boundaries, urban-industrial concentrations, and other factors, including atmospheric areas, necessary to provide adequate implementation of air quality standards.

ambient air - the unconfined space occupied by the atmosphere, i.e., outdoor air.

aquifer - a water bearing stratum of rock, gravel or sand which is measured by yields of wells or by height of the water table.

biochemical oxygen demand (BOD) - a measure of the amount of oxygen consumed in biological processes that break down organic matter in water; a measure of the organic pollutant load.

carbon monoxide (CO) - a colorless, odorless, very toxic gas produced by any process that involves the incomplete combustion of carbon-containing substances such as coal, oil, gasoline and natural gas.

dissolved oxygen (DO) - the oxygen freely available in water and necessary for aquatic life and the oxidation of organic materials.

effluent - an outflow; a discharge or emission of a liquid or gas; the greated or untreated liquid that flows out of a waste treatment plant, a sewer or industrial out-fall.

emission standard - the maximum amount of a pollutant that is permitted to be discharged into the air from a single source.

floodplain - flat lands usually adjacent to rivers or streams that are susceptible to inundation.

groundwater - water in the porous rocks and soils of the earth's crust; a large proportion of the total supply of fresh water.

hydrocarbons - many of a vast family of compounds originating in materials containing carbon and hydrogen in various combinations. Some may be carogenic.

implementation plans - a state blueprint of the steps that will be taken to ensure attainment of an air quality standard within a specified time period.

land disposal method - advanced waste treatment that uses soil, air, plants and bacteria to remove pollutants from waste water. It includes four basic processes: pretreatment to screen out large solids; chlorination and vegetation in the soil; spraying over cropland where vegetation and microorganisms in the soil remove additional pollutants; and reclamation by wells or drain tiles.

nitrogen dioxide (ND$_2$) - a brown, odorless gas that is toxic at high levels and is a precursor of photochemical smog.

non-point source - any non-confined area from which pollutants are discharged into a body of water, i.e., agricultural run-off, and sedimentation from construction sites.

Ozone (O_3) - a pungent, colorless, toxic gas; one component of photochemical smog.

particulates - dust particles in the air.

parts per million (ppm) - a volume unit of measurement; the number of parts of a given substance in a million parts of air.

G2

planned unit development (PUD) - a combination of zoning and subdivision controls which synthesize housing, community facilities and open space.

point-source (water) - any discernible, confined and discrete conveyance, including any pipe, ditch, channel, tunnel, conduit, well, discrete operations, or vessle, or other floating craft, from which pollutants are or may be discharged into the water.

point-source (air) - a stationary source that emits a given pollutant into the air.

pretreatment - any process used to reduce the pollutant load before the waste is introduced into a sewer system or delivered to a treatment plant.

primary treatment - the first stage in waste water treatment in which floating waste or solids are mechanically removed by screening and sedimentation.

river basin - one of 267 major and minor basin areas drained by a river and its tributaries.

secondary treatment - the second step in most waste treatment systems in which bacteria consume the organic parts of the wastes. It is accomplished by bringing the sewage and bacteria together in trickling filters or in the activated sludge process.

sewer, interceptor - a sewer which collects the sewage frpm the main and trunk sewers and carries them to points of treatment or discharge.

sewer, lateral - a street sewer that serves a limited number of properties and discharges into a trunk sewer.

sewer, trunk - a sewer that transports waste water from collecting (lateral) sewers to the treatment plants.

slope - a measurement of the topography of the land.

sludge - the solids removed from waste water by sedimentation and precipitation; often presents a problem of ultimate disposal.

sulfur dioxide (SO_2) - a heavy, pungent, colorless gas formed primarily by combustion of coal, oil, and other sulfur-bearing compounds, but also produced in chemical plants and by processing metals and burning trash.

trickling filter - a bed of rocks that supports bacterial growth used to treat waste water; a secondary treatment process where sewage is trickled over a bed of rocks so that bacteria can break down organic wastes.

ACRONYMS - The following acronyms have been used throughout the [illegible].

CAA - The Clean Air Act of 1970
CEQ - Council on Environmental Quality
CFS - Cubic feet per second
COPAMS - Commonwealth of Pennsylvania Air Monitoring Station
DELCORA - Delaware County Regional Water Quality Control Authority
DER - Pennsylvania Department of Environmental Resourc
DOT - Department of Transportation (either Fed DOT or [illegible]
DRBC - Delaware River Basin Commission
DVRPC - Delaware Valley REgional Planning Commission
EDU - Equivalent dwelling units
EIS - Environmental Impact Statement
ELP - Emission limitation plan
EPA - U.S. Environmental Protection Agency
FWPCA - Federal Water Pollution Control Act Amendments of 1972
GPD - gallons per day
GPM - gallons per minute
HUD - U.S. Department of Housing and Urban Development
KW - Killowatt

LVC - Little Valley Creek
MGD - millions of gallons per day
ML - Millileter
MG/L - milligrams per liter
MSL - mean sea level
NEPA - National Environmental Policy Act of 1969
NPDES - National Pollutant Discharge Elimination System
PPM - parts per million
SEPTA - Southeastern Pennsylvania Transportation Authority
SMSA - Standard Metropolitan Statistical Areas
SRB - Schuylkill River Basin
SRBS - Schuylkill River BAsin Study
STP - sewage treatment plant
UG/M^3 - micrograms per cubic meter
USDA - United States Department of Agriculture
USGS - United States Geological Service
VC - Valley Creek
VFSA - Valley Forge Sewer Authority
VMT - vehicle miles of travel
WAMIS - Water Quality Management Information System

APPENDIX 1

History of Proposed Project

ELLIS E. STERN ACTING CHAIRMAN
WILLIAM B. BROSIUS
W. ELLIOTT JONES
JOSEPH S. MUNSHOWER EXEC. SECRETARY

STEWART HUSTON
ERNEST F. MACDONALD
THOMAS B. McAVOY

RAYMOND E. PRIZER
THOMAS M. SLACK
MISS ELLEN ANN ROBERTS
RICHARD P. BYLER COUNTY PLANNER

CHESTER COUNTY PLANNING COMMISSION
518 NORTH WING COURT HOUSE WEST CHESTER, PENNSYLVANIA 19380

EXHIBIT 1

July 28, 1971

Delaware River Basin Commission
Box 360
Trenton, New Jersey 08603

Re: Chester County Planning Commission
Board Endorsement of the Valley Forge
Regional Waste Water Treatment Plant

Gentlemen:

The municipalities involved, the Chester County Planning Commission by Board Action in May 1970, the Delaware Valley Regional Planning Commission on its Board and technical committees in July 1970, have all approved the Valley Forge regional project, and the County requests that you also ensure this action by suitably amending your regional plan. This plan was approved by your staff during discussion in July 1970.

This action is a culmination of nearly 10 years of planning, during which every effort was made to exhaustively explore every available alternative.

During the early phases of the planning it did at first appear that it might be feasible for the municipalities in the Valley Creek Drainage Basin to be served at the Upper Merion Trout Run Plant, and those in the French and Pickering Basins at an expanded Phoenixville Plant.

Repeated efforts were made by the Chester County municipalities involved to negotiate agreements without success. The basic underlying reasons for this problem was the fact that the loadings from the Chester County municipalities were much too large for the existing plants to handle and that it was not feasible to expand to that extent. Upper Merion reported that they just did not have the room to build a much larger plant. Phoenixville also needed the limited excess capacity for their own needs and also had limited site for expansion. In addition business interests in Phoenixville were able to secure a rider that the outlying municipalities could not serve any shopping area, a provision that was considered both illegal and unacceptable by the surrounding municipalities.

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Both the Phoenixville and the Upper Merion plants are approaching their design capacities so that there would not be economies of scale, rather only some possibilities of economy of operation from having two plants on one site. However, there is not really adequate room on either site. The proposed Valley Forge subregional plant would have both economies of design scale as well as operations, and we believe that it is now a better technical solution.

Final design has been completed. The State Department of Environmental Resources has given the entire Valley Forge Regional project a high priority for 1971-1972 funding. The project would relieve a large proportion of the serious sewage problems area in Chester County and open up hundreds of acres of highly accessible land to new housing opportunities.

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Yours truly,
Richard P. Byler
Richard P. Byler,
County Planner

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ANK E. FEHELEY
CHAIRMAN
WILLIAM M. KEIM
IHN S. TRINSEY, Jr.
JOHN W. O'DONNELL, JR.
W M M. SMITH
BERT W. GEERDES
OWNSHIP MANAGER
JAMES E. MENESES
SOLICITOR
ALD N. ROBERTS, P.E.
Township Engineer

SUPERVISORS OF
UPPER MERION TOWNSHIP
KING OF PRUSSIA, PA. 19406

1789

Cross Roads of History and Tomorrow

(215) 265-2600

April 22, 1970

EXHIBIT 1a

John J. Coscia, P.E.
Water & Sewer Planning Engineer
Delaware Valley Regional Planning Commission
Penn Square Building
1317 Filbert Street
Philadelphia, Pennsylvania 19107

Re: Upper Merion Township Authority Trout Run Plant, Abrams Pumping Station, Interceptor and Force Main

Dear Mr. Coscia:

This letter details our reasons for advising the municipalities to the west of Tredyffrin Township that Upper Merion does not feel it can accept sewerage for treatment, as per a letter dated January 6, 1970. It covers the points discussed at our recent meeting.

This subject has been under consideration actively by our Authority since early 1966. We have reached our conclusion after consideration of the following points:

1. Our plant site is restricted in size, bounded by an industrial park, the Reading Railroad and an impounding silt basin owned by the Pennsylvania Department of Forests and Waters. The attached map shows the dimensions of one plant and indicates the total capacity 15 MGD. On the surface of this prediction, we could handle the whole Valley Creek area but, based on our experience and the predicted growth of the whole Valley Creek area, we feel the predictions (see Exhibit A) are conservative, at best. This capacity estimate, higher than we were quoted before, is the result of a new look at the plant site by our engineers after our meeting. As it can be seen from A, even without the townships to the west of Tredyffrin, we will be at two-thirds our estimated site capacity in 1985, if the estimates are correct. Based on our experience and the experience of Tredyffrin, we feel these projections are extremely conservative. For example, in 1966, Tredyffrin estimated its flow

What a man does for himself dies with him; what a man does for his community lives on . . .

to be .68 MGD in 1970. In October of 1969, Tredyffrin's actual flow was .83 MGD or 22% higher than estimated. In 1968, Tredyffrin upped its 1970 estimate to .80 MGD, which will be exceeded by at least .05 MGD in 1970 and perhaps more. The March flow from Tredyffrin is approaching .90 MGD.

Our history leads us to the conclusion that, even if we take the largest estimates received, these will be far short of actual flow and that, by 1985, Upper Merion and Tredyffrin (Trout drainage only) could easily require a 15 MGD Plant. This estimate takes into account the large amount of land in Upper Merion, which will undoubtedly be used for high density residential purposes, along the Schuylkill Parkway, and the undeveloped areas in Tredyffrin, which will go for high density residential or industrial areas, and the increasing flow per EDU due to increased water usage and family growth in Upper Merion and Tredyffrin. If we take Valley Creek in Tredyffrin, which is still a possibility, it appears a certainty that our site is inadequate.

2. We are currently sewering two (2) drainage basins in the commonly named Trout area, the Meshelmac and the Abrams creeks, encompassing Upper Merion and Tredyffrin, and have recently accepted the effluent from Easttown, also in the basin area.

We are cooperating in the Matsunk area with Tredyffrin and have just accepted a sizeable portion of that Township in this drainage area. In addition, we have negotiated with Bridgeport and West Conshohocken, in the past, to take their flows into Matsunk, but these communities elected not to join with us. Because of the current problem at the under-sized Bridgeport Plant, we have reinitiated discussions with Bridgeport in an effort to help this community. Current expansion of our Matsunk system into the Rebel Hill area (now under final design) will also benefit West Conshohocken, if they are interested, and we have offered this cooperation.

To sum up, we have actively sought to assist the surrounding communities since the inception of our Authority in 1959.

3. Our experience at the Keebler Road Pumping Station has been disasterous. Due to the length of the lines coming to this pumping station, which is the main lift station for the Trout Run Plant, septicity has developed regularly despite every effort to prevent it, including chlorination at sub-pumping stations and ozonation at Keebler. The odor problem at this site (in the center of a residential community) has caused us to eliminate this lift station and build a new main lift station in an area where, hopefully, this odor problem will not exist (current Beidler Pumping Station now under construction).

If our Keebler experience is any indicator, septicity will develop in the tremendously long lines needed to serve the communities west of Tredyffrin. This will cause odor problems of tremendous proportions at Trout Run. The prevailing winds from this plant are directly into our Cabot, Cabot & 7 Forbes Industrial Park and heavily populated residential areas. Another serious odor problem at Trout Run would make our Keebler Road headache seem insignificant. We do not feel we can subject our citizens to this situation.

4. Our Trout Run Plant empties into the Schuylkill, approximately 18,000 feet above the intakes of the Norristown Water Company, in the pool of the Norristown Dam. It appears to us that it would be far better to use the assimilation ability of the Schuylkill above our plant than to attempt to put the effluent load from one site into this pool at one plant site. There is approximately 2½ miles of rapidly moving stream between Valley Creek and Betzwood (approximately the beginning of the Norristown Dam pool) and almost an additional mile prior to our plant inlet. It seems to us that this length of the Schuylkill would aid immeasurably in assimilating the load from the Valley Creek drainage area and is positively a better situation for the character of the river than if this whole load dumped into the Schuylkill at one site. Certainly, if anything ever went wrong at one site and if we handled the Valley Creek area effluent, we would more seriously jeopardize not only the Norristown Water supply but also the whole recreational facilities which have developed along the shores of the river in this area. On the other hand, with two plants, one

emptying into the river at Valley Creek and one at our site. Even if both developed problems, the situation would be less serious.

5. Economically, there appears to be little to choose between expanding our plant to handle Valley Creek or to build an additional plant which would handle Valley Creek. We both, essentially, will be starting from scratch. If all of the Valley Creek area were to come to Trout, a major pumping station would be needed along the lower reaches of Valley Creek above the covered bridge. This would necessitate an over-flow line to the river to prevent contamination of Valley Creek in an emergency. A treatment plant at the same site would need nothing more than a similar effluent line to the river and the costs of a major pumping station and a long large force main would be eliminated.

Since any community west of Tredyffrin must pipe its effluent to any plant that it built, whether it be in Upper Merion, Tredyffrin or elsewhere, an effluent line in the bed of Valley Creek to the river from any plant on any section of the creek seems to be a real possibility. Such a situation would eliminate creek contamination problems at no extra cost and would also eliminate the need for the treatment limits currently placed on a plant in the East Whiteland area.

If the argument is that one larger plant at Trout is less costly to build and operate, we question if the needs of site expansion, a major pumping station, a large force main, an over-flow line and other costs of getting sewage to Trout have been realistically estimated. As to the cost of treatment, even if Trout were to handle all effluent from the Trout area and the Valley Creek area, the costs would not be that great since the two plants will probably finally wind up somewhere between 10 and 15 MGD plants, both efficient low per gallon cost units.

To sum up, site size restrictions, the possibility of severe problems to our citizens, our past record of cooperation with adjoining communities where it served both our communities, the location of our plant in the Norristown

Dam Pool, and the economies of the situation lead us to the conclusion that we should not attempt to serve the communities west of Tredyffrin Township.

We believe a review of the whole area by your staff will lead you to the same conclusion.

Respectfully,

ROBERT W. GEERDES,
TOWNSHIP MANAGER/
ADMINISTRATIVE SECRETARY
UPPER MERION TOWNSHIP
MUNICIPAL AUTHORITY

RWG:epr

Enclosures

EXHIBIT "A"

ESTIMATED FLOWS AT TROUT RUN

MGD

UPPER MERION	TREDYFFRIN Trout	TREDYFFRIN Valley Creek	OTHER Valley Creek
1969 Actual - 4.4	.83 (Oct.)	----- ------	------------
1970 Est. - 3.0	.85 (.68[1])	1.1[1]	
1975 Est. - 3.3	.81[1]	.99[4] (1.38[1])	
1985 Est. - 6.0[2]	1.21[1] (2.0[2])	1.28 (1.1[3]) (1.95[1])	1.4[3]
2000 Est. - 6.8[2]	2.0[2]	2.0[4]	

1. Letter - Tredyffrin Authority to Upper Merion - 1/12/66.

2. Analysis of Present & Projected Wastewater flows, by A. W. Martin Associates, Inc. - 1/5/66.

3. Letter - Tredyffrin Authority to Upper Merion - 7/12/67.

4. Letter - Tredyffrin Authority to Upper Merion - 10/26/67.

TOTAL FLOWS BASED ON LARGEST ESTIMATES

1970 - 3.85 (without Valley Creek Tredyffrin)
1970 - 4.95 (without Townships west of Tredyffrin)
1975 - 4.11 (without Valley Creek Tredyffrin)
1975 - 5.48 (without Townships west of Tredyffrin)
1975 - (with Townships west of Tredyffrin)
1985 - 8.0 (without Valley Creek Tredyffrin)
1985 - 9.95 (without Townships west of Tredyffrin)
1985 -11.35 (with Townships west of Tredyffrin)

EXHIBIT 2

April 23, 1970

Mr. Richard P. Byler
Chester County Planning Commission
Court House
West Chester Pennsylvania 19380

Dear Mr. Byler: Re: Valley Forge Sewer Authority

Enclosed herewith are copies of Mr. Roger's letter to Mr. Roger B. Reynolds, solicitor for Montgomery County Sewer Authority, dated December 3, 1969 and copies of Mr. Reynolds letter to Albright and Friel, Inc., dated December 12, 1969. I can find no copy of any other letter from Mr. Reynolds but a note in my file indicates that he told me during a telephone conversation that Montgomery County Sewer Authority would not have capacity for Valley Forge Sewer Authority, that if his Authority expanded, it would not be for five or ten years and would not include adequate capacity for Valley Forge Sewer.

Sincerely yours,

Susan P. Windle

SPW:s
enc.

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APPENDIX 1 EXHIBIT 3

Evaluation of Sewage Treatment Alternatives
Valley Forge Sewer Authority
Montgomery County Sewer Authority

BACKGROUND

A. Statement of the Problem and Status of Projects

The Valley Forge Sewer Authority is currently ready to construct an 8 MGD sewage treatment plant to be located in Northern Chester County which will discharge its effluent to the Schuylkill River. This sub-regional plant will serve all or portions of the following municipalities at this time:

> East Pikeland Township; Charlestown Township, Schuylkill Township; Tredyffrin Township; Easttown Township, Willistown Township; East Whiteland Township and Malvern Borough

The Montgomery County Sewer Authority is currently preparing plans to expand and upgrade its Oaks Sewage Treatment Plant in Montgomery County from 2 MGD to 10 MGD. This plant also discharges to the Schuylkill on the opposite bank. The Oaks plant currently serves Upper Providence Township, Lower Providence Township and Limerick and will provide services to Skippack, Royersford, Collegeville, Trappe, Worcester, Lower Frederick, Perkiomen Township and areas contiguous to the Lower Perkiomen interceptor.

On April 18, 1972 Mr. Henry L. Longest, P. E., Chief of Planning Section of the U. S. Environmental Protection Agency, Region III in a letter to Mr. Walter Lyon, Director, Bureau of Water Quality Management of the Pa. Dept. of Environmental Resources requested that the following alternatives be analyzed because of the close proximity of the two plants.

Alternate 1: All sewage treatment for the two authorities to be carried out at the Valley Forge site.

Alternate 2: All sewage treatment for the two authorities to be carried out at the Oaks site.

Alternate 3: Sewage for the separate authorities be treated at the separate authority sites.

In order to discuss these alternatives and establish a direction for the analysis, a meeting of all concerned parties was hosted by the Delaware Valley Regional Planning Commission on May 12, 1972. In attendance

13 were the following:

John Coscia	Delaware Valley Regional Planning Comm
John O'Neal	Region III, Environmental Protection Ag
Charles Rehm	Pa. Dept. of Environmental Resources
Glen Witmer	Pa. Dept. of Environmental Resources
C. Brooke Jones	Montgomery County Sewer Authority
R. A. Falciani	Betz Environmental Engineers (MCSA)
A. Petersen	Betz Environmental Engineers (MCSA)
R.M. Best	Buchart-Horn (VFSA)
J. F. Richards	Buchart-Horn (VFSA)
D. L. McGill	Buchart-Horn (VFSA)
Dr. Joseph Weinstock	Chairman, Valley Forge Sewer Authori Chairman, Valley Forge Joint Board

It was agreed that this analysis would be conducted jointly by Montgomery County Sewer Authority's Engineer and Valley Forge Sewer Authority's Engineer. It was further agreed that the analysis would be brief and concise. Substantiating information assembled over as much as 10 years is available but not included in this analysis.

B. Background of Projects

The following are brief chronologies of the two projects outlining the major developments to date.

1. Valley Forge Project

Valley Forge Sewer Authority - E. Pikeland, Charlestown, SchuylkillTwp.

a. Originally designated to be served by the Borough of Phoenixville - 1967.

b. Efforts to obtain service from Phoenixville failed - 1970

c. Valley Forge Sewer Authority approached Montgomery Co. to provide service by way of a river corssing. Due to specific conditions in the Oaks project, service was not obtainable - 1969.

d. Valley Forge investigated constructing a 2 MGD plant to serve the three townships - 1970.

e. Valley Forge met with several other townships who likewise were unable to obtain a treatment agreement and established a joint effort to construct what is now known as the Valley Forge Area Sewage Treatment Project - 1970.

f. An amendment to the Chester Co. Water and Sewage Plan was requested and granted designating the plant as sub-regional - 1970.

g. Plans were prepared, grant applications made and necessary permits obtained - 1971.

h. The participating municipalities had a similar but longer history and were unable to jointly receive service from the Trout Run STP in Montgomery Co. 1962-63 - 1970.

1. Each of these participating communities evaluated alternative local treatment plants discharging to the Valley Creek prior to aligning with the Valley Forge Sewer Authority by means of formal agreement.

Current Status: Ready to Advertise Project - 8 MGD STP

2. Montgomery Co. Project - Oaks Plant

This background information to be provided by BETZ Environmental Engineers

Status of Project: Design

II. ANALYSIS OF ALTERNATES

A. Basis of Comparison

In comparing alternatives it was agreed that the viable alternative from both good planning and engineering consideration would be a plant 18 MGD capacity located at either the Oaks or the Valley Forge site. With regard to the cost of construction it is assumed that the construction cost would not vary significantly from site to site. Therefore with respect to cost analysis no distinction was made between construction on the Oaks or Valley Forge site.

It was recognized that the two current project as proposed are out of phase by almost one year and that the 18 MGD alternative would result in a time delay due to necessary engineering studies and design, revision of the Chester Co. and Montgomery Co. Water and Sewer Plans; establishment of formal working legal agreements, obtaining necessary regulatory agency permits, and re-application time for State and Federal aid to cover the revised project. Experience of the Valley Forge Sewer Authority would indicate that the elapsed time period to bring the 18 MGD project to the bid stage would be a minimum of 3 years with all parties being agreeable to the change. Costs, site requirements, capacity requirements and the impact on the river were considered in the analysis.

B. Capacity Requirements of Each Area

1. Valley Forge Area Project

Each community has agreed formally to purchase a portion of the 8 MGD plant based on population projections to the year 1985.

These projections were developed by various engineers and planning agencies and are based on the owner's current zoning. 1985, a relatively short design year, was selected on the basis of economics and with consideration being given to the development of future changes in technology which might minimize future costs. Population projections beyond 1985 to the year 2000 dictated consideration of a site which could be developed to 20 to 24 MGD for the Valley Forge area. Practical experience indicate that current zoning regulations will change when the sewers are available and that growth in all probability outstrip the current projections. Consideration has been given to having the Valley Forge Plant 17 serve areas of East and West Vincent Townships in the future. Also, the Valley Forge Authority is aware of the potential need to serve areas such as Spring City should the need arise or the request be made, if these systems developed the need for an additional 3 to 4 MGD minimum.

2. Oak Area

The design year for the Oaks expansion is also 1985 for the same reasons. The expansion for 2 to 10 MGD considers expansion of rapidly growing service areas. The potential requirement for the Oaks area is estimated at 20 to 24 MGD.

C. Treatment Plant Site Analysis

1. Oaks

The Oaks site provides for an ultimate capacity of about 25 MGD based on the latest treatment requirement. This figure considers recent technology (the UNOX process) which is effective in minimizing the space needs.

2. Valley Forge

The Valley Forge STP site is currently 28.5 acres as purchased. This acreage provides capacity to 20 MGD with conventional treatment. With the adapting space saving processes such as UNOX being contemplated by Oaks the same site would provide capacity to 25 to 30 MGD.

D. Analysis of Impact on the River - One Plant vs. Two Plants

The total quantity of pollutants to be discharged to the river would be the same whether one or two or more plants operate since the permitted discharges are eventually arrived at by distributing and allocation based on available capacity of the river. The only consideration would be the question of whether a larger regional plant would produce a better effluent more consistently because of the possibility of attracting more qualified personnel.

Looking at the actual sizes of plants under consideration and the planning to date for both counties with regard to operations, it is the Engineer's opinion that the individual plants and systems are both sufficiently large that the qualification of personnel is not a significant factor.

Consideration of two plants of this size would actually offer a greater degree of protection to the stream due to unpredicted outages or malfunction of one or the other.

E. Cost Comparison

The following estimates are the Engineer's estimated project costs for major system components in both areas at 1972 costs.

Estimated Project Costs of Oaks STP Expansion	10 MGD	$ 8.300,000
Estimated Project Costs of VFSA STP	8 MGD	6,200,000
Estimated Cost of Joint Facility	18 MGD	
a. Treatment Plant		11,200,000
b. River Crossing/Pump Sta.		1,700,000
	Total	$12,900,000
Estimated Cost of Chester Co. Sewer, Interceptor Projects depending on STP to proceed		$36,000.000
Estimated Cost of Montgomery Co. Sewer Interceptor projects depending on STP to proceed		$11,500.000

Based on experience of the last few years in Philadelphia area the following approximate cost escalation factors would be applicable to this project.

STP - three years hence	23% increase (Eng. News Record extrapolated)
Sewers - three years hence	19% to 29% increase (Eng. News Record extrapolated)

Exhibit "A" shows the financial analysis giving annual operating cost estimates of the separate plants and the 18 MGD plant with consideration of cost escalation.

The annual costs showing sewer systems at escalated prices is also given. The costs presented would be directly chargeable to all users in the Valley Forge System. In the Montgomery system the costs presented reflect what would be additional costs to the current system. The advantages of a joint plant would be some operating cost savings.

Basis of Future Costs

Project Cost of 18 MGD plant 3 years hence

($12,900,000) (1.23) = $15,800,000

Project Cost of Valley Forge area sewers and Montgomery sewers 3 years hence

($36,000,000 + 11,500,000 (1.19) = $56,500,000

F. Other Considerations

Because of widely different methods of financing and because of realistic political differences it is felt that the accomplishments of a new formal agreement would be complex and in all probability would result in a delay longer than three years. If so, the cost differences would be greater. The current project user costs in Chester County are extremely high at this time. The basic reason for both projects is to relieve existing intolerable sanitary conditions in both counties as well as to provide for future growth. The current residents need the service without delay.

Both groups have made significant expenditures in planning and engineering a good portion of which would be unrecoverable.

IV. SUMMARY

The Analysis shows

A. There is a need for the space at both sites to contend with growth in both counties.

B. There will be no difference in the pollutional impact to the River.

C. It is more economical to construct separate plats.

ANNUAL COST COMPARISONS

TREATMENT PLANT

	8 MGD V.F. STP	10 MGD Oaks STP	18 MGD Joint STP
Initial Project Cost	$ 6,200,000	$ 8,300,000	$15.800,000
P. L. 660 Grant 60%	- 3,720,000	- 4,980,000	- 9,480,000
Sub-Total:	$ 2,480,000	$ 3,320,000	$ 6,320,000
Exist. Mont. Co. S. A. Debt	0	0	1,500,000
BOND ISSUE TOTAL	$ 2,480,000	$ 3,320,000	$ 7,820,000
Annual Debt Service 40 yrs. @ 6.5%	$ 175,000	$ 234,000	$ 554,000
20% Coverage	35,000	47,000	111,000
Annual Operating	410,000	315,000	720,000
Sub-Total:	$ 620,000	$ 596,000	$ 1,485,000
Operating Funds(P. L. 339)	- 49,600	- 66,000	- 126,400
TOTAL	$ 570,400	$ 530,000	$ 1,358,600
TOTAL ANNUAL COST	$1,100,400		$ 1,358,600

COLLECTION SYSTEMS

	8 MGD V.F. STP	10 MGD Oaks STP	18 MGD Joint STP
Initial Project Cost	$36,000,000	$11,500,000	$56,500,000
Est. IPC Eligible for P. L. 660	7,000,000	2,000,000	11,000,000
Est. 660 @ 60%	- 4,200,000	- 1,200,000	- 6,600,000
BOND ISSUE TOTAL	$31,800,000	$10,300,000	$49,900,000
Annual Debt Service 40 Yrs. @ 6.5%	$ 2,250,000	$ 730,000	$ 3,540,000
20% Coverage	450,000	146,000	708,000
TOTAL DEBT	$ 2,700,000	$ 876,000	$ 4,248,000
O & M & A	250,000	125,000	375,000
TOTAL ANNUAL	$ 2,950,000	$ 1,001,000	$ 4,623,000
TOTAL	$3,951,000		$ 4,623,000

SUMMARY ANNUAL COSTS

	8 MGD V.F. STP	10 MGD Oaks STP	18 MGD Joint STP
Plants	$ 570,400	$ 530,000	$ 1,358,600
Sewers	2,950,000	1,001,000	4,623,000
TOTAL	$ 3,520,400	$ 1,531,000	$ 5,981,600
	$5,051,400		$ 5,981,600
ANNUAL COST SAVINGS	$ 930,200		

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Staff Review of Valley Forge Sewer Authority's Application for Construction of a Regional Sewage Treatment Plant and Interceptor Sewers, Pumping Stations and Force Mains

I. Background

1. Name of Applicant: Valley Forge Sewer Authority
2. Address: 801 Valley Park Road, Phoenixville, Pa. 19460
3. Principal Contacts:

Richard P. Byler
County Planner
Chester County Planning Commission

Dr. Joseph Weinstock, Chairman
Valley Forge Sewer Authority

Douglas L. McGill
Buchart-Horn
Consulting Engineers and Planners
Valley Forge Sewer Authority

Arthur F. Loeben, Director
Montgomery County Planning Commission

T. Briganti
Project Review Branch
Delaware River Basin Commission

Christian Beechwood
Regional Sanitary Engineer
Pennsylvania Health Dept.

Thomas H. Cahill
Environmental Health Engr.
Chester County Health Dept.

4. Proposed Project: U.S. Environmental Protection Agency construction grant application for the Valley Forge Sewage Treatment Plant and an interceptor sewer system. The areas to be served by the interceptor system include East Pikeland, Schuylkill and Charlestown Townships. The treatment plant will serve East Pikeland, Schuylkill, Charlestown, Tredyffrin, Easttown, East Whiteland, Willistown and Malvern, all in Chester County.

5. Project Cost:

Project Cost:	Federal Grant	$ 2,802,747
	Local Share	$13,142,597
	Total Project Cost	$15,945,344

B. File Information

1. Date received by DVRPC: February 4, 1971
2. Date qualified as application: August 2, 1971
3. Date review complete: October 13, 1971
4. Reviewed by: John Coscia, P.E., Water & Sewer Planning Engineer
   Dennis Dahlem, Regional Review Coordinator

II. Project Description

The proposed Valley Forge sewage treatment plant has a design capacity of 8 million gallons per day and a design year of 1985. The plant will consist of grit chambers, primary clarifiers, aeration tanks, final clarifiers, sand filters, chlorine contact tank, sludge dewatering centrifuges and an incinerator.

The proposed treatment plant will be located in Schuylkill Township, Chester County in the vicinity of Perkiomen Junction and will discharge its effluent to the Schuylkill River.

The proposed interceptor sewers will be located in East Pikeland, Schuylkill and Charlestown Townships, Chester County. The inceptor system includes various sized sewers, 9 pumping stations and various sized force mains up to 30 inches in diameter.

III. Consistency with Regional Planning

Intensive negotiations between the Valley Forge Sewer Authority and the Borough of Phoenixville have indicated that it is not possible to work out the necessary intergovernmental agreements for sewage treatment. Phoenixville Borough feels that they will soon need all or most of their limited plant expansion to service their own internal needs, particularly the newly annexed areas which are proposed for relatively high density development. There was also internal opposition within the Phoenixville community to provide sewerage service beyond Borough boundaries.

Upper Merion has indicated in writing that they could not accept sewage for treatment at the Trout Run plant from the Valley Creek communities west of Tredyffrin Township. They base their decision on Trout Run plant site size restrictions, the possibility of severe odor problems, the past record of cooperation with adjoining communities, the location of the existing plant in the Norristown Dam pool and the economics of the situation.

The need for adequate sewerage facilities for both the Valley Forge and Valley Creek communities is great and in certain areas acute. On-site disposal facilities are inadequate and the proposed immediate residential, commercial and industrial development require public sewerage systems.

At thepresent time, there is no final regional planning proposal for meeting the water pollution control needs of the entire Schuylkill River drainage basin. However, efforts are underway by the Pennslyvania DER, DVRPC, DRBC, Montgomery County and Chester County to initiate a Schuylkill River Basin Regionalization Study Group to investigate and determine the proper long-range water pollution control plan for this basin. It is fairly obvious that the cluster of small sewage treatment plants in the Spring City to Norristown stretch of the river does not provide the optimal long-range solution required for this portion of the region.

The treatment facility design concept, as developed by Buchart - Horn and submitted on behalf of the communities involved, is to build a plant in parallel increments, with each increment being constructed with only marginal reserve capacity. This approach would insure that the plant is reasonably loaded at all times to improve its performance and would result in minimizing the initial construction cost. This concept of limited life and minimal capital expenditure is being pursued so as to facilitate the implementation of the long-range plan that will be developed. The consultant states that it was felt that within 10 to 15 years such a regional system could be a reality. The proposed Valley Forge Treatment Plant would be abandoned or phased out at such time, provided that the economics are favorable.

The proposed project is consistent with the Regional Water Pollution Control Plan and planning process. The project achieves the regional objectives in this portion of the region in that:

(1) the proposed sewage treatment plant is designed to adequately serve a projected 1985 equivalent population of 80,000 persons. The following plant capacities have been reserved:

Municipality	Capacity (MGD)	Equivalent Population
Valley Forge Authority (East Pikeland, Schuylkill and Charlestown Twp.)	2.00	20,000
Tredyffrin	1.50	15,000
East Whiteland	1.60	16,000
Malvern	0.53	5,300
Willistown	1.00	10,000
Easttown	0.90	9,000
	7.53	75,300

Nominal design capacity of plant is 8.0 mgd therefore there remains an unallocated capacity of 0.47 mgd for future demand.

(2) the proposed treatment plant will provide a reduction of 95% of the BOD and 96% of the Suspended Solids and produce an effluent which meets the existing water quality standards of Pennsylvania and the Delaware River Basin Commission.

(3) the DVRPC amended its Regional Water Pollution Control Plan on July 22, 1970 and designated the Valley Forge plant to be the sub-regional sewage treatment plant with the responsibility of providing treatment capacity on an equitable basis for municipalities in the French and Pickering Creek drainage basins comprised of East Pikeland, Schuylkill and Charlestown Townships; and the Valley Creek drainage basin comprised of Tredyffrin, East Whiteland, Malvern, Willistown and Easttown.

(4) the facility and service area are consistent with regional and local land use and development plans.

(5) the proposed facilities provide an economically feasible solution for meeting the water pollution control needs of the area.

IV. Intergovernmental Coordination

The Chester County Planning Commission endorses the proposed project as being consistent with the Chester County Master Sewerage Plan (537). The County plan was amended in April, 1970 to provide for this Valley Forge system.

The Chester County Health Department endorses and encourages this proposed project.

The Pennsylvania Department of Environmental Resources has issued a permit authorizing construction of the proposed project.

The Delaware River Basin Commission included the proposed project in its Comprehensive Plan and further approved construction of the proposed facilities. (Docket D-71-117-CP)

The Montgomery County Planning Commission has indicated the proposed project is inconsistent with overall water quality management and good regional planning. The following is taken directly from their March 22, 1971 letter to DVRPC:

In the Technical Supplement attached to the Montgomery County Sewage Facilities Plan, an assessment of the Valley Forge Sewer Authority's proposal is made:

"The Valley Forge Sewer Authority, which is comprised of several municipalities in Chester County, is contemplating construction of a new waste water treatment facility somewhere along the Schuylkill River in the vicinity of its confluence with French Creek. At the writing of this report, it appears as though this facility has the endorsement of all required regulatory agencies. Even though wheels are turning to implement this plan, it is our intention here to let others recognize that we feel that construction of another facility along this reach of river is inconsistent with overall water quality management and good regional planning.

"As previously mentioned, this reach of the Schuylkill is the most complicated area in regards to waste waters treatment facilities in the entire County. Another facility would only add to this complication. We feel that all reasonable alternatives for the disposition of waste waters from the Valley Forge Authority area have not been investigated. Design and construction of this plant should be put off until the County or counties have time to have an in-depth regional feasibility study made of this region. If it is then found that results of this study support the presence of another plant, then work on this plant should be allowed again to continue."

The Phoenixville Area Retailers Association has strenuously objected to the proposed project. In a June 11, 1971 letter to DVRPC the following comments were made:

> "While we agree that these areas need sewage disposal facilities and we are in favor of these facilities being installed, we feel however the comprehensive plans adopted by DVRPC have not been implemented in Chester County"...
>
> "Under the DVRPC Plan ..... the Regional Land Use Plan recommends ...... a pattern of land use which can assist them in achieving the following goal -" The rejuvenation of the old urban areas."
>
> "We request EPA withhold any financial assistance to V.F.S.A. unless and until Chester County adopts a County Comprehensive Plan and Land Use Plan with related zoning under the Goal of DVRPC to rejuvenate the old urban areas..."

V Environmental Impact

The proposed project will not have a deleterious effect on the environment. The proposed facilities will meet the existing air quality and water quality standards of the regulatory agencies.

The construction of the proposed facilities will eliminate a potential health hazzard problem by providing public sewer service in areas with serious on-site overflow problems.

VI. Comment

The staff finds the proposed project consistent with the Regional Water Pollution Control Plan and planning process and recommends that the TAC forward the application to the PCC and Board with favorable comment.

30<

DELAWARE RIVER BASIN COMMISSION
P. O. BOX 360
TRENTON, N. J. 08603

July 29, 1971

AUG 6 1971

Project Review

NOTICE OF COMMISSION ACTION

Docket No. D-71-117-CP

Project Sponsor:
Dr. Joseph Weinstock, Chairman
Valley Forge Sewer Authority
1234 Pothouse Road
Phoenixville, Pa. 19460

Project Description: A sewage treatment plant to be located in Schuylkill Twp. Chester County, Pa.

Referred by: Penna. Department of Environmental Resources

Action by Commission:

Included in the Commission's Comprehensive Plan for the Delaware River Basin and approved pursuant to Section 3.8 of the Delaware River Basin Compact. See attached docket for terms and conditions.

Explanatory Note:

This action has been taken by the Commission in accordance with its responsibilities under Sections 3.8, 11.1 and 11.2 of the Delaware River Basin Compact. The Commission maintains a comprehensive water resources plan for the Delaware River Basin and reviews water resources projects proposed by other public and private agencies. Review of projects enables the Commission to prevent conflicts among water users and to protect the integrity of the Comprehensive Plan.

W. Brinton Whitall, Secretary

enc.
cc:
Dr. Goddard
Mr. Dennis Dahlem
Mr. C. Beechwood
Mayor G. D. Barr

DOCKET NO. D-71-117 CP

DELAWARE RIVER BASIN COMMISSION

Valley Forge Sewer Authority
Sewage Treatment Plant
Schuylkill Township, Chester County, Pennsylvania

PROCEEDINGS

This is an application submitted on behalf of the Valley Forge Sewer Authority by the Pennsylvania Department of Environmental Resources on July 9, 1971, for review of a new sewage treatment plant project. The application was reviewed for inclusion of the project in the Comprehensive Plan and approval under section 3.8 of the Compact, and certification under section 21 of the Water Quality Improvement Act of 1970. A public hearing on this project was held by the Delaware River Basin Commission on July 28, 1971.

The project was approved by the Pennsylvania Department of Environmental
2c Resources on June 29, 1971, but they are withholding their permit until the project
is approved by the Delaware River Basin Commission.

The Delaware Valley Regional Planning Commission has been notified of pending action on this docket and has not expressed an objection to its approval by the Delaware River Basin Commission.

COMPREHENSIVE PLAN DESCRIPTION

Purpose.--The purpose of this project is to construct a new comprehensive sewerage system and sewage treatment plant to serve large areas in Chester County which presently are not sewered.

Location.-- The proposed treatment plant will be located in Schuylkill Township, Chester County, Pennsylvania and will discharge the treated effluent to the Schuylkill River at river mile 92.47 - 32.0. The collection sewers of the Valley Forge Sewer Authority will be located in East Pikeland, Schuylkill and Charlestown Townships.

Service area.-- The area to be served by the Valley Forge Authority sewers consists of East Pikeland, Schuylkill and Charlestown Townships. The Valley Forge Sewer Authority treatment plant will also serve Malvern Borough and portions of Easttown, Tredyffrin, East Whiteland and Willistown Townships.

Physical features.

(a) Design criteria.--The proposed treatment facility has been designed to serve the 1985 projected population of 80,000 persons. Based upon 100 gallons per person per day, the plant is designed for average flow of 8.0 mgd.

(b) Facilities.--The proposed treatment plant will include three grit removal units, two primary tanks, two aeration tanks, two final settling tanks, a chlorine contact tank, three chlorinators, two sludge dewatering centrifuges, an incinerator, six pressure sand filters and one post-aeration basin.

The collection system for East Pikeland, Schuylkill and Charlestown Townships includes pumping stations known as Forge Manor, Pickering Creek, Sandra Lane, French Creek, White Horse Road, Kimble Drive, Calley Creek, Pothouse Road, and Charlestown Road.

(c) Other.--Sludge will be incinerated and the ash will be landfilled.

All pumping stations and the sewage treatment plant are equipped with emergency power systems. There are no overflow pipes or bypasses for direct discharge.

Relationship to the Comprehensive Plan.-- The proposed project is a new treatment plant and therefore has not been previously included in the Comprehensive Plan.

FINDINGS

Intensive negotiations between the Valley Forge Sewer Authority and the Borough of Phoenixville have indicated that it is not possible to work out the necessary intergovernmental agreements for sewage treatment. Phoenixville Borough feels that they will need all or most of their limited plant capacity for their own internal needs.

Upper Merion Township has indicated that they could not accept sewage for treatment at their Trout Run plant from the Valley Creeks Communities west of Tredyffrin Township. They base their decision on Trout Run plant site size restrictions, the possibility of severe odor problems, the past record of cooperation with adjoining communities, the location of the existing plant in the Norristown Dam pool and the economics of the situation.

The need for adequate sewerage facilities for both the Valley Forge and Valley Creek communities is great and in certain areas acute. Onsite disposal facilities are inadequate and the proposed immediate residential, commercial and industrial development require public sewerage systems.

The proposed project is designed to produce a discharge meeting the effluent requirements and stream quality objectives of article 2-1 of Section X: Water Quality Standards, of the Comprehensive Plan.

The treatment plant is designed to meet the proposed Pennsylvania standards for the Schuylkill River in the zone between Blackrock Dam and Fairmount Dam.

The treatment plant is designed to remove 95% of the BOD_5 and 96% of the suspended solids. The characteristics of the proposed discharge are estimated to be as follows:

Flow	8.0 mgd
pH	7.0
Alkalinity	100 mg/l
Suspended Solids	10 mg/l
BOD_5	12.5 mg/l
Dissolved Oxygen	5.0 mg/l
Turbidity	4.0 units
Nitrogen-ammonia	3.0 mg/l
Nitrogen-nitrite	.05mg/l
Nitrogen-nitrate	.20mg/l
Phosphate	20.0 mg/l

The project does not conflict with nor adversely affect the Comprehensive Plan. It provides beneficial development of the water resources, is financially and physically feasible, conforms to accepted public policy, and does not adversely influence the present or future use and development of the water resources of the Basin.

DECISION

I. The project, as described above, is hereby added to the Comprehensive Plan, section IX.

II. The project is approved pursuant to section 3.8 of the Compact, subject to the following conditions:

a. Approval is subject to all conditions imposed by the Pennsylvania Department of Environmental Resources.

b. The plant shall be available at all times for inspection by the Delaware River Basin Commission.

c. The plant shall be operated at all times to comply with the requirements of Section X: Water Quality Standards, of the Comprehensive Plan

d. When the proposed treatment plant is completed, the interim treatment plant described in Docket No. D-71-12 CP and approved by the Delaware River Basin Commission on June 22, 1971, shall be abandoned and all flows will be transferred to the new treatment plant.

e. Upon completion of construction of the approved project, the sponsor shall submit a statement to the Commission, signed by the sponsor's engineer or other responsible agent, advising the Commission that the construction has been completed in compliance with the approved plans.

f. The area served by this project is limited to the service area as described above. Any expansion beyond this area is subject to review in accordance with section 3.8 of the Compact.

III. The Executive Director is authorized to issue a certificate of compliance in accordance with section 21 of the Water Quality Improvement Act of 1970.

BY THE COMMISSION

DATED: July 28, 1971

EXHIBIT 4
VALLEY FORGE SEWAGE TREATMENT PLANT AGREEMENT

THIS AGREEMENT, dated as of the first day of November, A.D. 1970, by and between VALLEY FORGE SEWER AUTHORITY, a joint municipality authority organized by the Townships of Schuylkill, East Pikeland, and Charlestown and operating under the provisions of the Municipality Authorities Act of 1945, Act of May 2, 1945, P.L. 382, its supplements and amendments (hereinafter referred to as the "Authority" and a "municipality"), the TOWNSHIPS OF SCHUYLKILL, EAST PIKELAND, CHARLESTOWN, EAST WHITELAND, TREDYFFRIN, WILLISTOWN, and EASTTOWN, second class townships (each of which is hereinafter called "Township" and "municipality"), the BOROUGH OF MALVERN (hereinafter called "Borough" and "municipality"), MALVERN MUNICIPAL AUTHORITY, EAST WHITELAND MUNICIPAL AUTHORITY, TREDYFFRIN TOWNSHIP MUNICIPAL AUTHORITY, and EASTTOWN MUNICIPAL AUTHORITY (each of which is hereinafter called "municipality authority"), 3 all of which are municipality authorities or political subdivisions within the County of Chester, Commonwealth of Pennsylvania.

WHEREAS, the parties have provided for or constructed, or are about to provide for or construct sanitary sewer collection systems; and

WHEREAS, the parties desire to dispose of sewage described hereinafter by a Treatment Plant to be located on the Schuylkill River in Schuylkill Township, Chester County, Pennsylvania; and

WHEREAS, Malvern, Tredyffrin, East Whiteland, and Easttown have each formed a municipality authority; and

WHEREAS, Willistown Township is about to form a municipality authority and all parties desire that it become a party upon its formation; and

WHEREAS, all parties desire that Valley Forge Sewer Authority shall operate said Treatment Plant but desire to exercise control over major decisions concerning the design, construction, operation, and expansion of said Treatment Plant; and

WHEREAS, various economies will inure to the benefit of each party from the joint construction and use of the Treatment Plant.

NOW, THEREFORE, in consideration of the mutual covenants herein contained, the parties hereto, intending to be legally bound hereby, covenant and agree as follows:

ARTICLE I

JOINT BOARD AND CONSTRUCTION OF TREATMENT PLANT

Since the agreement entails a great number of pages, its size precludes its inclusions.

EXHIBIT 5

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION III
6th & Walnut Sts., Philadelphia, Pennsylvania 19106

October 26, 1972
(Date)

NEGATIVE DECLARATION

To all Interested Government Agencies and Public Groups

Please refer to: 3-OGC-ND-P-1

Gentlemen:

In accordance with EPA procedures for the preparation of environmental impact statements, an environmental assessment has been performed on the proposed Agency action below:

30

The Valley Forge Sewer System, comprised of the following Authorities:
(Official Project Name)

Valley Forge, Eastown, East Whiteland, Malvern, Tredyffrin Township and Willistown Township, Chester County, Pennsylvania
(Location-City, State)

The assessment process did not indicate a significant environmental impact from the proposed action. Consequently, an environmental impact statement will not be prepared.

An environmental impact appraisal, which summarizes the assessment and the reasons why a statement is not required is on file at the above office and will be available for public scrutiny upon request.

Sincerely,

Daniel J Snyder III

Signature and title of responsible official:
Edward W. Furia
Regional Administrator

Ad Hoc Sewer Committee
3 Devon Road
Malvern, Pennsylvania
19355

EXHIBIT 6

Mr. Edward W. Furia
Regional Administration
EPA Region 3
Curtis Building
Sixth & Walnut
Philadelphia, Pennsylvania
19106

Dear Mr. Furia:

Enclosed please find a copy of a petition titled: A Petition to the U. S. Environmental Protection Agency from the Undersigned Residents of Willistown Township.

This petition requests the EPA to do an impact study of the sewer system proposed by the Valley Forge Municipal Authority, Chester County, Pennsylvania.

We have obtained 1163 signatures.

The six basic questions we feel should be answered are listed on the petition. In a letter to follow we will go into greater detail on these questions, providing some of the information we have gathered.

Because of the lack of time available in presenting this petition we cannot go into detail at this time.

We would appreciate your consideration of this request, and a reply concerning your decision.

Yours truly,
Joseph B Gellings
Ad Hoc Sewer Committee

Joseph Gellings, Chairman	3 Devon Road, Malvern, Pa.
Norman Nields	2 Rolling View Drive, Paoli, Pa.
Rita Robertson	131 Spruce Lane, Paoli, Pa.
Helen Joseph	103 Pine Tree Road, Paoli, Pa.
Harold Roeder [illegible]	28 Sunset Drive, Paoli, Pa.
GeorgeFish	14 Sunset Drive, Paoli, Pa.

Reproduced from best available copy.

A Petition to the U. S. Environmental Protection Agency from the Undersigned Residents of Willistown Township

We, the residents of Willistown Township, hereby ask for an Environmental Impact Study to be done by the U. S. Environmental Protection Agency.

The proposed Valley Forge Sewer System should be thoroughly investigated as to its impact on our environment and from the standp of the immense cost proposals.

Listed below are some of the questions that should be investigated:

1) All Existing Problems - Does the area to be sewered in Willistown include, during the initial phase, all the exist public health and stream polluting problem areas?

2) Unnecessary Involvement - Does the area to be sewered in Willistown in fact include mostly areas with no existin public health and stream polluting problems?

3) Plant Location - Is the proposed site of the Sewage Pl and also the trunk lines above or below the Flood Plain?

4) Dollar Value - Are we getting our moneysworth in light of the most current technology, considering the treatment quality expected to be provided?

5) Environmental Impact - What will be the impact of the proposed system on the Schuylkill River considering future conservation programs, recreation facilities, water supply sources, power generating facilities, and other sewage treatment plants?

6) Unbelievable Costs - Are the Federal Grants that are subject to EPA approval adequate to make the proposed plan financially feasible for the majority of the township residents affected?

Signed:

Reproduced from best available copy.

EXHIBIT 6

A PETITION TO THE U. S. ENVIRONMENTAL PROTECTION AGENCY FROM THE UNDERSIGNED RESIDENTS OF EAST WHITELAND TOWNSHIP

We, residents of East Whiteland Township hereby request the U. S. Environmental Protection Agency to perform an Environmental Impact Study of the proposed Valley Forge Sewer System.

The proposed System should be thoroughly investigated as to its impact on our environment and from the standpoint of the immense cost proposals.

Listed below are some of the questions that should be investigated:

1) All Existing Problems - Does the area to be sewered in East Whiteland include, during the initial phase I, all the existing public health and stream polluting problem areas?

2) Unnecessary Involvement - Does the area to be sewered in East Whiteland in fact include mostly areas with no existing public health and stream polluting problems?

3) Plant Location - Is the proposed site of the Sewage Plant and also the trunk lines above or below the Flood Plain?

4) Dollar Value - Are we getting our moneysworth in light of the most current technology, considering the treatment quality expected to be provided?

5) Environmental Impact - What will be the impact of the proposed system on the Schuylkill River considering future conservation programs, recreation facilities, water supply sources, power generating facilities and other sewage treatment plants?

6) Unbelievable Costs - Are the Federal Grants that are subject to EPA approval adequate to make the proposed plan financially feasible for the majority of the township residents affected?

Signed:

[illegible] Fennimore - 4 Beechwood ave Frazer
[illegible] Hershey - 21 Beechwood Ave Frazer
[illegible] W. Braxie 73 Malin Road Malvern
[illegible] Dunn 72 Lancaster Pike, Malvern
[illegible] 72 Fram ave Malvern
[illegible] 33 Prospect Ave Frazer

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EXHIBIT 7

November 22, 1972

NOTICE OF INTENT

To All Interested Government Agencies and Public Groups

Please refer to: 3-OGC-IS-P-2 (supersedes 3-OGC-ND-P-1
dated 10/26/72)

Gentlemen:

Due to the comments generated by the Negative Declaration dated 10/26/72 and in accordance with EPA guidelines for the preparation of environmental impact statements, attached is a notice of intent to prepare such a statement for the proposed Agency action specified below:

Project Name: The Valley Forge Sewer System, comprised of the following Authorities:

Location: Valley Forge, Eastown, East Whiteland, Malvern,
Tredyffrin Township, and Willistown Township,
Chester County, Pennsylvania

Impact Statement No.: 3-OGC-IS-P-2

If your organization needs additional information or wishes to participate in the development and preparation of the draft environmental impact statement, please direct written correspondence to the undersigned or telephone Mr. Steven Torok, Environmental Impact Branch, 215-597-9893, by January 10, 1973.

Robert J. Blanco

Robert J. Blanco, P.E.
Chief
Environmental Impact Branch
Region III
Environmental Protection Agency

NOTICE OF INTENT

ENVIRONMENTAL PROTECTION AGENCY

REGION III

Please refer to: 3-OGC-IS-P-2 (supersedes 3-OGC-ND-P-1 dated 10/26/72)

1. Project Location: Valley Forge, Eastown, East Whiteland, Malvern, Tredyffrin Township, and Willistown Township, Chester County, Pennsylvania

2. Estimated project cost:

Project		Total Cost	EPA Grant Request
1. Valley Forge Sewer Authority	Treatment Plant Interceptors, Collectors	$15,945,344	$4,671,240
2. East Whiteland Municipal Authority	Interceptors, Collectors	5,978,265	387,950
3. Malvern Municipal Authorities	Interceptors, Collectors	2,762,186	141,650
4. Tredyffrin Township Municipal Authority	Interceptors, Collectors	14,130,000	3,799,000
5. Eastown Municipal Authority	Interceptors, Collectors	4,835,900	326,350
6. Willistown Township Municipal Authority	Interceptors, Collectors	6,379,600	420,800
	TOTAL	$50,031,295	$9,746,990

3. Period covered for input to the Draft Environmental Impact Statement:

Beginning Date - November 17, 1972

Length of Time - two months

Approximate Ending Date - January 10, 1972

4. Estimated application filing date - January 15, 1971

APPENDIX 2

Letters and Petitions from Residents - Purpose

EXHIBIT 1

March 30, 1971

Mr. C. Beechwood
Regional Sanitary Engineer
875 New Hope Street
Norristown, Penn.

Dear Mr. Beechwood:

For the past year, the physicians on the staff of the Phoenixville Hospital have been very much aware of the seriousness of the problem with sewage in the area surrounding Phoenixville, particularly on the South and Southeastern aspect of the Borough. We feel that there have been cases of hepatitis which have been directly related to the sewage problems in these areas.

There have been several requests by individual physicians for the urgent need for sewage facilities to the developments in these particular areas. We understand that many of the attempts for rapid progression of a satisfactory sewage disposal system have been met with many hours of frustration and unwarranted delays.

The physicians of the Phoenixville area urge that immediate steps be taken to solve these problems as soon as possible before a serious epidemic of disease results in this area.

Thank you for your help in this matter.

9/

Very truly yours,

Reproduced from best available copy.

Charles F. Miller, M.D.
President Phoenixville
Hospital Medical Staff

CFM:w
cc: Joseph Weinstock, Ph.D.

Future Institutional

EXHIBIT 1

May 2, 1973

Philadelphia Office of E.P.A.
Region III,
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

ATTENTION: Mr. Blanco

Dear Mr. Blanco:

I am writing to your office to inquire about the environmental impact study that is being done related to the extension of sewer service by the Valley Forge Sewer Authority in Schuylkill Township.

Our YMCA is in the planning stage of building a new facility at our outdoor facility, Baker Park, which is located in Schuylkill Township on Pot House Road, between Route #29 and White Horse Road. Our projected timetable for the erecting of this building is 1976. Since the Sewer Authority will not be able to receive the necessary funding until the Environmental Impact Assessment is done to satisfy the conditions for the release of these funds, we would appreciate your cooperation in expediting the necessary administrative data to speed up the process. For us to adequately build this facility with approval by the Township, we would need to have an adequate sewer system hook-up and we would hopefully tie in to the proposed system which would come down Pot House Road by the Valley Forge Sewer Authority. 42

I would appreciate any service you can render in enabling the Valley Forge Sewer Authority to move ahead with this most important project, which would not only serve the YMCA, but thousands of other people to have an adequate sewer system.

Thank you in advance for your attention to this plea.

Very sincerely,

Reproduced from best available copy.

Donald J. L. Coppedge
Executive Director

DJLC:cm
CC: Valley Forge Sewer Authority; Mr. Jerry Yuntz, Chairman
Planning Committee; Mr. Charles Berger, Assistant Chairman
Planning Committee

March 17, 1970

EXHIBIT 1

Valley Forge Sewer Authority
Attention: Dr. Joseph Weinstock
1234 Pothouse Road
Phoenixville, Pa. 19460

Dear Valley Forge Sewer Authority:

We represent residents of sections of three townships situated in what has been designated as Area I by the Valley Forge Sewer Authority. Area I is recognized by the Chester County Board of Health, the Valley Forge Sewer Authority and the Area Planning Commission as an area where an extreme health hazard and emergency condition exist.

The residents of the sections of these three townships met recently to discuss problems resulting from over-flowing cesspools in front and back yards. In some places sewage flows down streets and into storm sewers, thus contaminating a wide area. Some residents are troubled with sewage back-up in their homes. In addition to the afore mentioned, some residents have well water. These people are most alarmed about these conditions and are further concerned about the health of their children and the wider area public school population.

13

Dr. Joseph Weinstock of the Valley Forge Sewer Authority spoke to this group and stated that negotiations had been underway to provide a temporary hook-up with the Phoenixville borough sewer plant. This temporary hook-up would service approximately 450 families until the Valley Forge Sewer Authority could provide permanent facilities. At the present time, the Valley Forge Sewer Authority is at a stalemate with the Phoenixville Borough Council over providing service to this distressed area. It was brought out at this meeting that if negotiations would be completed, sewer service could be furnished within a year.

Some objections to our receiving sewer service have been posed by Phoenixville merchants, who fear a shopping center could be developed in the township. It is not our intent to undermine the businessmen of Phoenixville either through a joint effort or through promotion of a shopping center. To the best of our knowledge, Area I does not contain property suitable for a shopping center. Although marches, boycotts, sit-ins are prevailing it seems that somewhere individuals should be capable of discussions which will result in satisfactory decisions for all concerned.

Reproduced from best available copy.

This is not a small minority group problem. The disease implications alone encompass a wide area. One child infected as a result of disease laden sewage could, by his school association, cause a potential area-wide epidemic such as typhoid, hepatitus and transmission of parasites.

Therefore we urge your immediate attention to this problem and request the Phoenixville Borough Council to extend temporary sewer service to Area I immediately.

Very truly yours,

(see attached)

Copies to: Phoenixville Borough Council
Phoenixville Chamber of Commerce
Phoenixville Area Retailer's Association
Schuylkill Township Supervisors

44

Reproduced from best available copy.

We, the taxpayers of Argyle Rd. and Hawthorne Place, Berwyn, Pa., this petition to Easttown Township for immediate action in the the installation of a proper Sanitary Sewage System.
The undersigned residents have indicated that they have or have sewage problems.

EXHIBIT 1

(45)

ADDRESS		HAVE	HAVE NOT
[illegible] M. Myers	1336 Argyle Rd. Berwyn	X	
P. Myers	" " "	X	
[illegible] Woodruff	1307 Argyle Rd. Berwyn	X	
[illegible] G. Woodruff Jr.	1307 Argyle Rd	X	
[illegible] Meacham	1327 Argyle Rd.	X	
[illegible] Meacham	1327 Argyle Rd	X	
[illegible]	1315 Argyle Rd	X	
[illegible] Conner	1315 Argyle Rd.	X	
[illegible]	1378 Argyle Rd	X	
Robert [illegible]	1378 Argyle Rd	X	
[illegible] Coggin	1371 Argyle Rd	X	
A. Coggin	1371 Argyle Rd.	X	
[illegible] Monastero	446 Hawthorne Pl	X	
[illegible] Monastero	446 Hawthorne Pl.	X	
[illegible]	1365 ARGYLE		X
[illegible] Dedlea	1365 ARGYLE		X
[illegible]	1366 Argyle Rd		X
[illegible]	1366 Argyle Rd		X
[illegible] J. Tucker	1373 Argyle Rd.	X	
[illegible] Tucker	1373 Argyle Rd.	X	
[illegible]	521 Hawthorne Place	X	
[illegible]	" "	X	
[illegible]	520 Hawthorne Pl	~~X~~	X
[illegible] Percival	520 "		X
[illegible] Patterson	519 Hawthorne	X	
[illegible] Patterson	" "	X	Encl.

Reproduced from best available copy.

nstallation of a proper sanitary sewage system.
The undersigned residents have indicated that they have or
t had sewage problems:

ANE	ADDRESS	HAVE	HAVE NOT
H. Kroehling	1333 Argyle Rd.	X	
Kroehling	1333 Argyle Rd.	X	
R. Steinle	1357 Argyle Rd	X	
[illegible]	1351 Argyle Rd.	X	
[illegible]	1333 Argyle Rd.	X	
[illegible]	" " "	X	
[illegible]	514 Hawthorne Pl	X	
[illegible]	515 Hawthorne Pl.	X	
[illegible]	" "	X	
John H Allen	1339 Argyle Rd	X	

Note

This Petition presented by Messrs
Coggins of 1371 Argyle Rd and
Mr. Meachum of 1327 Argyle Rd.
after the Board of Supervisors
meeting of 6 Dec 1971 adjourned.
The Petition was accepted by
[illegible], Twp Engr
for presentation to the Board
of Supervisors on 6 Dec 1971.

Twp Engr.

(46)

Mr. Cahill
Please see me
about this GJ

EXHIBIT i

the Willistown Twp. property owners residing on Long Lane
Route 202 and McKinley Ave, respectfully request that the
new sewer system be extended to service our homes. We
-acre lots and the present septic tank system has proven
y inadequate.

3/8/71

Mrs Dan Paul
Mr. Mac [illegible]
C. [illegible]
Mrs. Emery Morrison
Mrs John Boyer
Mrs. William Miller
Mrs F I Lacher
Welde
Mrs. Edmund F. [illegible], 5 Long Lane, Malvern, Pa
Mrs. Stanley A. Getchell
Mrs. Richard A. Nagel
rs. Edward F. Ward

(47)

Submitted to Willistown Twp. 3/9/71, and copy
mailed to Chester County Health Board 3/10/71
(to 326 N. Walnut St. - West Chester, Pa.)

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best available copy.

CHESTER COUNTY
TOWNSHIP BUILDING
Sugartown Road, R. D. 2, Malvern, Pennsylvania 19355
647-5300

D. Sherrerd, III
irman
Neff Ewing, Jr., Esq.
Chairman
H. Mateer

John L. Lukens
Secretary, Treasurer
William J. Davies
Zoning and Building Offi

EXHIBIT 1

February 8, 1972

Commonwealth of Pennsylvania
Department of Environmental Resources
1875 New Hope Street
Norristown, Pa. 19401

Attention: Mr. Charles Rehm
Chief - Planning

Gentlemen:

We have received your letter dated January 24, 1972 regarding the design and scope of a sewer system in the Malvern-Paoli area of Willistown Township and raising certain questions therein.

Long range planning for public sewers in this area has been conducted for over twenty years by various municipal officials and groups. Implementation has been complicated by the typography (top of a hill) and unavailability of a stream on which to locate a treatment plant.

The system as designed in the application before you includes the densely developed area of the township. South of P. S. #1 and #2 on Devon Road are large tracts of institutional lands and sparse residential housing on lots zoned for a minimum of two acres and four acres. It presently is estimated that the capital cost of including the 112 homes (one acre or more) south of Devon Road along Paoli Pike will approximate $10,000 or more each. 4

We do not foresee sale or development of the institutional land or other than sparse development of other land south of the proposed system for at least fifteen to twenty years. We do see continued commercial, industrial and apartment development within the proposed system, basically in the King Road - Lancaster Pike area.

Included with this letter are letters from the Chester County Planning Commission and the Chester County Department of Health approving our plans and our inclusion in the "Valley Forge Treatment Plant" and the "Valley Creek Trunkline" connecting the Paoli communities with the treatment plant.

We urge your favorable consideration.

Very truly yours,
Willistown Township Board of Supervisors

Wm D Sherrerd III
William D. Sherrerd, III
Chairman

WDS:msb

CHESTER COUNTY
Sugartown, R. D. 2, Malvern, Pennsylvania 19355
647-5300

February 8, 1972

ommonwealth of Pennsylvania
Department of Environmental Resources
975 New Hope Street
orristown, Pa. 19401

Attention: Mr. Charles Rehm
Chief - Planning

Re: Willistown Township Sewerage System

entlemen:

We are in receipt of your letter dated January 24, 1972 in which you raise everal questions regarding the scope of our presently designed sewerage system.

It is our further understanding that these questions arise as a result of our review of our application for Aid Request in conjunction with the subject sewerage system.

By way of answering the questions put forth in your letter please consider the following:

a. Willistown Township, through actions of its supervisors, has been actively engaged in meeting its obligations for attempting to provide sanitary sewers in areas of need for over 15 years.

b. Problems involving coordination with other political sub-divisions, topography, and the lack of suitable sized streams for local treatment plant discharge had, until recently, thwarted the implementation of a sewage collection system and treatment facility for this area of need.

c. The advent of the Valley Forge Sewer Authority with its large treatment plant on the Schuylkill River, in conjunction with the Tredyffrin Authority's Valley Creek trunk sewer, afforded Willistown Township the opportunity to participate in a regional effort. In November, 1970 Willistown Township signed the agreements with these two Authorities and became a part of the regional effort in sewage disposal. In this initial endeavor into a municipal sewage collection system, the Township Supervisors established the general area of Devon Road and Paoli Pike as the southern boundary of the collection system. These limits were established after careful consideration of population density, need based on difficulty with on-site systems, and economic considerations associated with inclusion of areas to the south of the Devon Road - Paoli Pike limit. These areas to the south have properties with considerably larger lot areas, and extension of a system into the area would involve significant quantities of non-assessable footage.

Just prior to the incorporation of the Willistown Municipal Authority in April of 1971, the Chester County Health Department directed the Township Supervisors to extend the proposed sewage collection system south of the Devon Road - Paoli Pike limit originally established. This extension, as recommended, is incorporated in the presently designed plans. The Authority now estimates that this extension, owing to large runs of non-assessable pipe and the servicing of large lot properties will cost in the area of one million dollars and service 117 properties (all single occupancy residences). Further, our preliminary estimates, based on a $10.00 per front foot assessment indicate that annual cost to owners benefiting from the presently designed system will be in the range of $275.00 to $300.00 per year.

e. On the basis of preliminary estimates given above, we have some fear as to the ability of the township to finance the presently designed system.

Extension of the system further to the south as questioned in your letter will mean servicing two acre lot properties and construction of significantly more non-assessable sewer lines. This area does not constitute a health hazard, as the County Board of Health recognizes. This extension is not economically feasible, would definitely jeopardize financing for the entire system, and would pose a severe financial burden on all of the property owners.

f. Due to the nature of properties, i.e. large estates, institutions, minimum two acre house lots in the area to the south of the proposed system, we do not foresee the need for a sewerage system for at least the next 15 to 25 years in the area.

g. Anticipating possible needs for a sewerage system in the West Chester Pike area (extreme south portion of Willistown Township), a feasibility survey for such a system is now under way in that area. This system would, if installed, use treatment facilities available within a Delaware County System now being proposed.

In summary, the plan as submitted more than meets the needs of the Township
or sanitary sewers through 1978 and beyond that time for several years. The plan
ects with the approval of the Township Board of Supervisors, the Chester County
lanning Commission and the Chester County Department of Health, as they have sig-
ified by separate letters. The 1.5 square mile area about which you have raised
ome question is in fact sparsely populated and could be included in the sewer
ystem only at a disproportionately high cost. All stations to be built are
lanned to be used for a minimum of fifteen years and hopefully will be in oper-
tion long beyond that. Any sewage problems not being met by the system as pro-
osed can be met for the foreseeable future by on-site sewage systems. Thus, the
ewer system presently before you for your consideration is consistent not only
ith the extensive long range planning which this Township has undertaken but also
ith the regional planning of nearby municipalities, will adequately serve the
eeds of the Township for sewer service for the foreseeable future, will abate
nsofar as presently possible the polluting effects of inadequate on-site instal-
ations and is itself stretching the economic ability of the Authority to install
nd operate. Any proposed addition not only would be premature from the stand-
oints of need and use, but would be so expensive as to render it impossible to
inance the entire project.

We hope this brief resume of our efforts regarding the matter of sewage
llection and treatment for Willistown Township will answer the questions con-
i in your letter of January 24, 1972. We hope also that you understand our
tion concerning the financial burden which will occur with any further exten-
on of a sewerage system beyond existing limits.

Since some of the questions in your letter of January 24, 1972 are directed
he Township Supervisors, we have forwarded a copy of the letter to them.
ey will comment in a separate letter.

As you know, the Willistown Township Municipal Authority is one of six
thorities participating in the funding of the Valley Forge Sewage Treatment
t and the Valley Creek Trunk Sewer. We are most anxious to have our plans
oved by all necessary agencies so as not to hold up proceedings of the entire
gional effort.

Please call on us at any time if any additional clarification of our plans
required.

We sincerely appreciate your cooperation in this matter.

Very truly yours,

Willistown Township Municipal Authority

William O. Reeside
Chairman

k:msb

CONSULTING ENGINEERS
LANDSCAPE ARCHITECTS
SURVEYORS

YERKES Associates inc.

101 CHARLES DRIVE • BRYN MAWR • PA. 19010 • • (215) LA 5-6200

EXHIBIT 2

April 9, 1973

Mr. Douglas L. McGill
Buchart-Horn Inc.
40 S. Richland Avenue
Box 1823
York, PA 17405

Dear Doug:

RE: VALLEY FORGE SEWERAGE PROJECT
ENVIRONMENTAL ASSESSMENT

I am in receipt of your letter of April 4. In response to the letter and our discussion during the last Joint Authority meeting, I am enclosing the following information: (1) For your general information, the copy of the Chesterbrook Geological Study; (2) A copy of the Ecological Inventory of Easttown Township.

As you know, we have previously submitted to you a great deal of the background information on the Easttown Sewerage Project in the form of sewerage feasibilities studies, etc. The Township is currently under orders from the Chester County Department of Health to sewer the entire township north of Sugartown Road and to include the Devon Hunt area, south of Sugartown Road. The Berwyn and Valley Forge areas have been in trouble for years with most of the sewage flow running in the local storm sewer system, the streets and local streams. I am including a plan showing the malfunctioning properties in the Devon Hunt area.

It was originally intended to not sewer the Daylesford area until 1985. Approximately a year ago, a petition from some of the residents in the area was presented to the Authority with a request for sewer service. As a result of this petition, an investigation was made. I am enclosing a plan showing the results of that investigation along with a copy of the petition. The area is in desperate trouble and needs sewers badly.

Included in this area is a section designated to Sharp's Woods. This is the Sharp's Woods Nature Preserve owned by the Philadelphia Conservationists Inc. The tract consists of low-ground that was not developable as was the remainder of the tract and was donated as a nature preserve. As you can see, the sewer in that area follows the stream which goes through this Nature Preserve. We have investigated possible alternatives and find that there are no economically feasible choices. The only possibility involves hundreds of feet of deep sewer and three additional small pump stations. It would appear that we would have to route the sewer through this property.

We have been in touch with these people, and it would seem that there is going to be some contention regarding the sewer route through the property and probably this ought to be mentioned.

It is to be noted that certain areas in Easttown, south of Sugartown Road, were considered for sewerage because of problems within the developments and were rejected because of the cost of the sewerage system for the area. This was for two reasons: (1) The areas lie considerably down stream on the Darby Creek Drainage basin, far enough down so that the cost of pumping back into the Valley Forge System was considered to be excessive; (2) The lots in the area are one-acre and larger; and it was decided that there was a lack of sufficient density to make the area economically feasible. It is obvious that if there is a sufficient need, the economics must be reconsidered; and at this point, consideration is being given to a feasibility study for that area with respect to the possible installation of package plants on an interim basis.

Please advise me if you require any further information.

Very truly yours,

YERKES ASSOCIATES, INC.

33

John

John B. Yerkes, Jr., P.E.
President

JBYJr/jb

Enclosures

BOARD OF SUPERVISORS
TREDYFFRIN TOWNSHIP
CHESTER COUNTY
973 OLD LANCASTER ROAD
BERWYN, PA. 19312

Kennedy, *Chairman*
Rentschler, *Vice Chairman*
Schipper
Pyle, Jr.
P. Brown, Jr.

Norman Maury
Township Manager
Louis A. D'Ambrosia
Director of Public Worl
Emily J. Peirce
Secretary and Treasurer
Richard Reifsnyder
Solicitor

May 21, 1973

EXHIBIT 3

Mr. Douglas L. McGill
Buchart-Horn
40 South Richland Avenue
York, Pennsylvania 17405

Re: Proposed Valley Creek Drainage Basin Sewer Project - Paoli Area

Dear Doug:

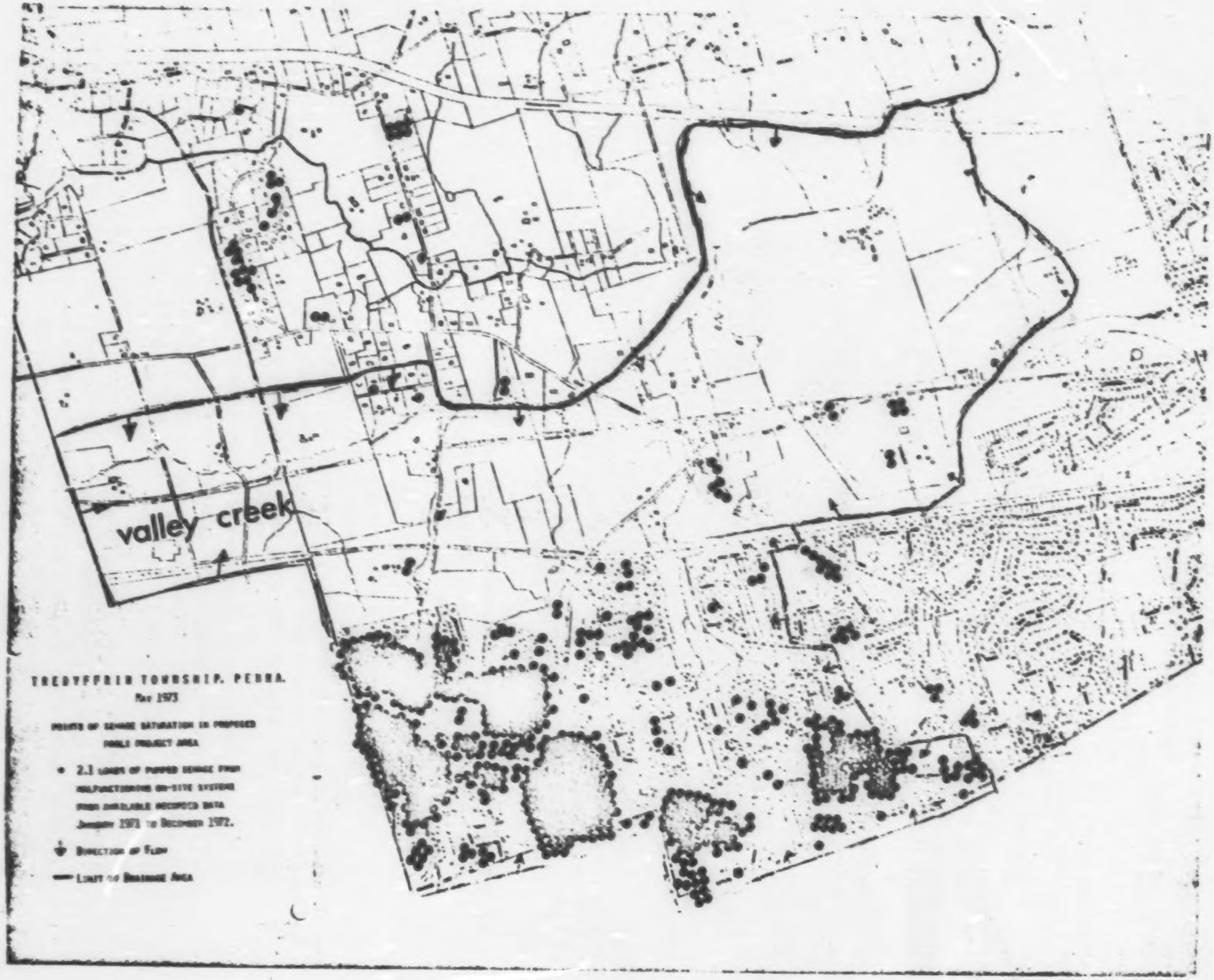
Enclosed is a photograph of a map showing the proposed Paoli Area project in Tredyffrin Township, which contains a large number of dark spots. Each of these spots, as indicated on the key, represents 2.1 loads of sewage pumped at that location, equaling approximately 2,100 gallons per load.

In this densely populated area, the soil has become completely saturated with sewage to the extent that it is not uncommon to see traces of sewage running 54 in gutters, especially after wet weather. The Valley Creek area is covered by Hagerstown-Conestoga-Guthrie soils. These soils are deep and silty on limestone and are considered variable and dangerous for subsurface sewage disposal. In areas where the watertable is close to the ground surface, percolation rates are very poor.

It is also indicated by the map that even some of the more recently constructed residences are starting to show subsurface drainage problems because of the poor percolation in the area. Many subdividers, who must install on-site sewage treatment facilities have to go to a great deal of expense before a building permit is issued for the construction of a new home because of the very poor subsurface drainage conditions.

The areas shown on the map are by no means a final conclusion of the areas pumped in the proposed Paoli Area sewer project. We have approximately ten to twelve cesspool cleaners, and we have only contacted four of the cleaners who do work in Tredyffrin Township. Because of the time element, it was not possible to make a very thorough study of the entire area with the other cesspool pumpers.

Consequently, some of the areas adjacent to the pinpoints could
lette very well have malfunctionning on-site sewage disposal facilities of
8' which we are not completely aware –


valley creek
TREDYFFRIN TOWNSHIP, PENNA.
May 1973
POINTS OF SEWAGE SATURATION IN PROPOSED
PAOLI PROJECT AREA
● 2.1 LOADS OF PUMPED SEWAGE FROM
MALFUNCTIONING ON-SITE SYSTEMS
FROM AVAILABLE RECORDED DATA
January 1971 to December 1972.
Direction of Flow
Limit of Drainage Area

CHESTER COUNTY HEALTH DEPARTMENT

326 NORTH WALNUT STREET
WEST CHESTER, PENNSYLVANIA 19380

TELEPHONE: 692-5670
AREA CODE 215

ARD OF HEALTH
ERT POOLE, M.D., CHAIRMAN
IEL LEE, M.D., VICE CHAIRMAN
REN L. DAVIES, PH.D.
ES E. MILLER
JAMIN REYNOLDS

LABOCCETTA, M.D., M.P.H
UNTY HEALTH DIRECTOR

EXHIBIT 4

April 26, 1973

ranklin R. Schutz, P.E.
uchart Horn Consulting Engineers and Planners
0 South Richland Avenue
ork, Pennsylvania 17405

Re: Malfunctioning Sewage Systems
Valley Forge Sewer District Area

ear Mr. Schutz:

his is in response to your verbal request for information on malfunc- ioning sewage systems. This Department has prepared by individual ownships, maps showing areas which are known to have a problem with alfunctioning subsurface sewage disposal systems. When reviewing this nformation the following facts must be considered

1) This Department becomes aware of malfunctioning sewage systems on a complaint basis, therefore, this Department does not feel that every continuous or intermittent sewage malfunction is so documented.

   In addition we are made aware of malfunctioning sewage systems when application for a permit is made to repair or replace a malfunctioning sewage system. In many cases, the private homeowner will have the sewage system pumped rather than submit himself to large expenditures to repair the sewage system.

   In areas where public sewers have been proposed, many individuals will choose to pump the sewage system, as a delaying action rather than pay the double cost of repairing the sewage system and then make connection to the municipal collection system.

2) In communities or subdivisions where the problem of malfunctioning sewage systems is common to almost all property owners it has been our experience that very few complaints of malfunctioning sewage systems are received by the Department. This fact also suggests that it is difficult to thoroughly define such problems.

3) Individual subsurface sewage systems may also malfunction vertically into the ground water table through solution channels or cracks in the underlying bedrock. This condition may occur where geology is unsuitable for subsurface sewage disposal systems or where older systems were installed in bedrock formations prior to adoption of regulations. This condition cannot be determined by visual observation, and in many cases with the downward movement into these cracks and channels in the bedrock, the sewage systems will not malfunction to the surface of the ground.

   In the target area no gross contamination of the ground water table has been documented by this Department since much of the area is supplied by a public water supply which is treated and whose source is generally outside the study area. We can make comparisons with other areas in Chester County, to show that ground water contamination can occur where subsurface sewage disposal has been installed.

4) Subsurface sewage disposal systems are only temporary. In years to come many sewage systems which now function properly will malfunction.

is Department supports development of municipal sewage collections the best means to prevent nuisances and health hazards.

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Sincerely,

Dennis L. Altland

Dennis L. Altland
Supervising Sanitarian

A/epj

APPENDIX 3

PLANTS, ANIMALS, BIRDS, AMPHIBIANS AND REPTILES

Benthic invertebrates collected in the Limerick Ecological Studies

Benthic invertebrate	Schuylkill River	Schuylkill creeks[a]	Perkiomen Creek
Platyhelminthes (flatworms)			
Tricladida			
Dugesia tigrina	x	x	x
Planariidae sp.		x	
Annelida (segmented worms)			
Oligochaeta (earthworms)			
Lumbricidae	x	x	x
Naididae	x	x	x
Enchytraeidae	x	x	x
Tubificidae	x	x	x
Lumbriculidae	x	x	
Branchiobdellidae		x	
Hirudinea (leeches)			
Dina	x	x	
Erpobdella punctata	x	x	x
Glossiphonia			
Helobdella stagnalis		x	x
Helobdella spp.	x	x	x
Nephelopsis	x	x	
Placobdella	x		
Mollusca			
Gastropoda (snails			
Amnicola			x
Ferrissia rivularis	x	x	x
Goniobasis virginica	x		
Gyraulus	x	x	x
Helisoma	x	x	x
Lymnaea spp.	x	x	x
Physa	x	x	x
Valvato		x	x
Pelecypoda (bivalves)			
Unionidae (mussels)			
Anodonta			x
Elliptio			x
Ligumia			x
Sphaeriidae (fingernail clams)			
Musculium	x		
Sphaerium	x	x	x
Arthropoda			
Isopoda (isopods)			
Asellus	x	x	x
Amphipoda (amphipods)			
Crangonyx gracilis	x		x
Gammarus	x	x	x
Hyalella azteca			x
Decapoda (crayfish, etc.)			
Cambarus bartoni		x	x
Orconectes limosus	x	x	x
Acarina (mites)			
Hydrachna			
Lebertia spp.	x	x	x
Limnesia			
Neumania			x

Benthic invertebrate	Schuylkill River	Schuylkill creeks[a]	Perkiomen Creek
Perithemis domitia	x		
Somatochlora	x		
Sympetrum			
Trapezostigma	x		
Agrionidae			
Agrion	x	x	
Coenagrionidae			
Anomalagrion hastatum	x		x
Argia	x	x	x
Enallagma	x	x	x
Ischnura	x	x	x
Lestes			
Coenagrionidae spp.	x	x	x
Plecoptera (stoneflies)			
Nemouridae			
Allocapnia		x	
Brachyptera		x	x
Leuctra	x	x	x
Nemoura		x	
Taeniopteryx	x	x	x
Perlidae			
Acroneuria		x	x
Neoperla		x	
Neophasganophora capitata	x	x	
Paragnetina		x	
Perlesta placida		x	x
Perlinella drymo	x	x	
Perlodidae			
Isogenus subvarians		x	
Isoperla		x	
Chloroperlidae			
Alloperla		x	
Hemiptera (true bugs)			
Hebridae (velvet water bugs)			
Hebrus			
Mesoveliidae (water treaders)			
Mesovelia mulsanti	x		x
Gerridae (water striders)			
Gerris	x	x	x
Metrobates	x		x
Rheumatobates	x	x	x
Trepobates	x	x	x
Veliidae (broad-shouldered water striders)			
Microvelia	x	x	x
Rhagovelia		x	x
Nepidae (water scorpions)			
Ranatra			x
Belostomatidae (giant water bugs)			
Belostoma			
Corixidae (water boatmen)			
Callicorixa	x	x	
Corisella			
Hesperocorixa	x		

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Benthic invertebrate	Schuylkill River	Schuylkill creeks[a]	Perkiomen Creek
Pionidae sp.			x
Sperchonopsis		x	
Unionicola			
Collembola (springtails)			
Isotoma		x	x
Isotomurus palustris			
Ephemeroptera (mayflies)			
Ephemeridae			
Ephemera	x	x	
Hexagenia	x	x	
Caenidae			
Caenis	x	x	x
Tricorythodes	x	x	x
Ephemerellidae			
Ephemerella	x	x	x
Leptophlebiidae			
Blasturus		x	
Chloroterpes		x	
Habrophlebiodes		x	
Leptophlebia		x	
Paraleptophlebia	x	x	
Baetidae			
Ameletus	x	x	
Baetis vagans		x	x
Centroptilum	x	x	x
Cloeon		x	
Heterocloeon		x	x
Isonychia	x	x	x
Pseudocloeon		x	x
Siphlonurus	x		
Heptageniidae			
Heptagenia	x		
Iron	x	x	
Stenonema	x	x	x
Odonata (dragonflies and damselflies)			
Gomphidae			
Dromogomphus			x
Gomphus			x
Lanthus	x	x	
Ophiogomphus	x	x	
Progomphus			
Aeschnidae			
Aeschna			
Anax	x		
Basiaeschna janata			x
Boyeria	x	x	
Gomphaeschna		x	
Cordulegasteridae			
Cordulegaster	x		
Libellulidae			
Erythemis	x		x
Libellula	x		
Macromia	x		x

Benthic invertebrate	Schuylkill River	Schuylkill creeks[a]	Perkiomen Creek
Palmacorixa	x	x	
Ramphocorixa acuminata			x
Sigara			x
Trichocorixa	x		
Megaloptera (alderflies, dobsonflies, fishflies)			
Sialidae (alderflies)			
Sialis	x	x	x
Corydalidae (dobsonflies, fishflies)			
Chauliodes		x	
Corydalus cornutus	x	x	x
Nigronia	x	x	x
Neuroptera (lacewings, etc.)			
Sisyridae (spongilla flies)			
Climacia areolaris			x
Coleoptera (beetles)			
Haliplidae (crawling water beetles)			
Haliplus	x		
Peltodytes	x	x	x
Dytiscidae (diving beetles)			
Agabus	x	x	
Bidessus		x	
Copelatus		x	
Deronectes		x	
Hydaticus			
Hydroporus		x	
Hydrovatus			
Ilybius		x	
Laccodytes		x	
Laccophilus	x		
Gyrinidae (whirligigs)			
Dineutes		x	x
Gyrinus			
Hydrophilidae (water scavengers)			
Anacaena			
Berosus	x	x	x
Cymbiodyta		x	x
Enochrus		x	
Helochares			x
Helophorus	x	x	x
Hydrochus	x	x	x
Laccobius		x	
Paracymus		x	
Tropisternus	x	x	
Hydrophilidae spp.		x	
Psephenidae (riffle beetles)			
Psephenus herricki	x	x	x
Dryopidae			
Helichus	x	x	x
Lutrochus		x	
Elmidae			
Ancyronyx variegatus	x		x
Dubiraphia	x	x	x
Macronychus	x	x	x

Benthic invertebrate	Schuylkill River	Schuylkill creeks[a]	Perkiomen Creek
Microcylloepus	x		x
Optioservus	x	x	x
Stenelmis	x	x	x
Chrysomelidae (leaf beetles)			
Donacia			
Trichoptera (caddisflies)			
Rhyacophilidae (free-living)			
Glossosoma		x	
Philopotamidae (retreat makers)			
Chimarra aterrima	x	x	x
Sortosa		x	
Wormaldia		x	x
Psychomyiidae (retreat makers)			
Polycentropus		x	
Psychomyia	x	x	
Psychomyiidae spp.			x
Hydropsychidae (net spinners)			
Cheumatopsyche	x	x	x
Diplectrona		x	
Hydropsyche betteni	x	x	
Hydropsyche phalerata	x		
Hydropsyche spp.	x	x	x
Macronemum carolina			x
Macronemum zebratum			x
Hydroptilidae (micro-caddisflies)			
Agraylea	x		
Hydroptila	x		x
Leucotrichia pictipes		x	x
Phryganeidae (tube cases)			
Agryphnia vestita		x	
Ptilostomis		x	
Leptoceridae			
Leptocella		x	x
Oecetis			x
Triaenodes	x	x	
Goeridae (tube cases)			
Goera		x	
Lepidostomatidae			
Lepidostoma		x	
Lepidoptera (moths, butterflies)			
Pyralidae (aquatic caterpillars)			
Cataclysta	x		x
Diptera (flies)			
Tipulidae (crane flies)			
Antocha	x	x	x
Erioptera			
Helius			
Hexatoma		x	x
Longurio			
Pilaria		x	
Prionocera			x
Rhaphidolabis	x	x	
Tipula ignobilis	x	x	x
Tipulidae spp.		x	

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Benthic invertebrate	Schuylkill River	Schuylkill creeks[a]	Perkiomen Creek
Liriopeidae (phantom crane flie.			
Liriope		x	
Psychodidae (moth flies)			
Pericoma	x		
Psychoda	x	x	
Culicidae (mosquitoes, phantom midges)			
Chaoborus			x
Simuliidae (black flies)			
Prosimulium		x	x
Simulium		x	x
Simuliidae spp.	x		
Chironomidae (midges)			
Pentaneura sp.	x	x	x
Polypedilum illinoense	x	x	x
Chironomidae spp.	x	x	x
Ceratopogonidae (biting midges)			
Dasyhelea			
Ceratopogonidae spp.	x		x
Stratiomyidae (soldier flies)			
Eulalia			
Stratiomys	x		x
Tabanidae (horseflies)			
Chrysops	x	x	
Tabanus	x	x	
Rhagionidae (snipe flies)			
Atherix variegata	x	x	
Sciomyzidae (marsh flies)			
Sepedon			
Tetanocera		x	
Sciomyzidae spp.			
Dolichopodidae (long-legged flies)	x		
Empididae (dance flies)			
Clinocera		x	
Dolichocephia		x	
Hemerodromia	x	x	x
Wiedemannia		x	
Empididae spp.	x	x	x
Ephydridae (shore flies)			
Brachydeutera		x	
Musidae (houseflies, etc.)			
Limnophora torreyae	x	x	

[a] Small tributaries of the Schuylkill in the immediate vicinity of the site.

Chironomidae of the Schuylkill River and Perkiomen Creek

Schuylkill River	Perkiomen Creek
Above Reading at West Leesport	Near Perkiomenville
Hydrobaenus (rheorthocladius) sp. 2 Roback	*Calopsectra guerla* Roback
Polypedilum illinoense Malloch	*Calopsectra* nr. *longiradius* (Kieffer) sp. 1
Below Reading at Gibraltar	*Calopsectra* nr. *longiradius* (Kieffer) sp. 2
Cricotopus bincinctus Meigen	*Calopsectra* sp. 7 (Roback)
Cricotopus (exilis) sp. 2 (Roback)	*Corynoneura* sp. 2 (Roback)
Hydrobaenus dorenus Roback	*Cryptochironomus fulvus* Johannsen
Pentaneura (melanops) spp.	*Harnischia pseudotener* Goetgebuer
Polypedilum illinoense Malloch	*Pentaneura auriensis* Roback
Psectrocladius sp. 3 (Roback)	*Polypedilum illinoense* Malloch
Tendipes decorus Johannsen	*Polypedilum scalaenum* Schrank
	Procladius riparius Malloch
Between Royersford–Spring City Bridge and railroad bridge below Mingo Run	*Tanytarsus (Stictochironomus) devinctus* Schrank
Calopsectra sp.	
Cricotopus bicinctus Meigen	
Cricotopus nr. *(trifasciatus)* sp.	
Glyptotendipes senilis (Johannsen)	
Pentaneura cf. *basalis*	
Pentaneura sp.	
Polypedilum illinoense Malloch	
Psectrocladius sp.	

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LIFE HISTORIES OF IMPORTANT FISH SPECIES

Muskellunge (*Esox masquinongy*)

The range of the muskellunge extends from southwestern Ontario to western New Brunswick and south to northern Alabama. It has been widely introduced, often without success, outside its range.[1,2]

The muskellunge inhabits lakes, rivers, and streams of low or moderate gradients and prefers clear water, sandy bottoms, and considerable areas of aquatic vegetation. It requires extensive flooded areas for reproduction.[1] The preferred temperature of juveniles from laboratory experiments[3] is 24°C.

Adult muskellunge[1] are usually 19 to 37 in. long and weigh 2 to 12 lbs. Sexual maturity is reached between ages 3 and 5. Spawning occurs from mid-April to late May at temperatures of 9.5 to 15.5°C (13°C optimum). Eggs are deposited indiscriminately over several hundred yards of shoreline in water 6 in. to 2.5 ft deep. Hatching occurs in 8 to 21 days at 21 to 12°C. In one study, only 34% of the eggs found in lakes were fertile. Females from Wisconsin ranging in size from 35 to 46 in. produced 22,000 to 164,000 eggs per female.[2]

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Common Shiner (*Notropis cornutus*)

This shiner ranges from southern Alberta to Nova Scotia and south to Colorado, Louisiana, and Virginia.[1]

It prefers small, clear streams of moderate to high gradients with bottoms of sand, gravel, or bedrock. Adults prefer gravel bottoms for spawning, particularly where brush or other cover is present in pools.[1]

Common shiners mature at ages 1 to 2 at lengths of 3 to 6 in. Males either construct nests or use those of other species, particularly the creek chub. Spawning has been reported at water temperatures from 14.5 to 25.5°C, and males guard the nests following spawning.[2]

This shiner is known to feed on algae, rotifers, microcrustacea, and insects.[2]

Spottail Shiner (*Notropis hudsonius*)

This shiner is found from Alberta to Quebec and south along the Atlantic coast to Georgia and in the Mississippi Valley to Missouri and Kansas.[1,2]

The spottail shiner prefers clear waters with a bottom of sand or gravel. Its decrease in certain Ohio waters is attributed to increased silting and turbidity.[1]

Spottail shiners[1,2] mature at ages 1 to 2 at lengths of 3 to 5 in. They reportedly spawn in closely packed groups, with no evidence of nesting.[2]

Young spottails up to 10 mm eat mainly rotifers and algae; up to 70 mm, microcrustacea (zooplankton); larger shiners eat insect larvae, zooplankton, fingernail clams, fish eggs, and small shiners.[2]

Swallowtail Shiner (*Notropis procne*)

The swallowtail shiner is found from the Delaware and Susquehanna watersheds south to the James River drainage in Virginia.[4]

It reportedly prefers sandy streams.[4] Large individuals may reach a length of 3 in.[2]

Spawning occurs in June and July in New York, in shallow riffle areas over fine gravel and sand. Males guard nesting territories, but nests are not constructed.[2]

Food habits are largely unknown.

Spotfin Shiner (*Notropis spilopterus*)

The range of the spotfin shiner extends from eastern North Dakota to Lake Champlain and south to Missouri and the Potomac River.[1,2]

It is tolerant of a wide variety of habitats, occurring in greatest abundance in streams of low or moderate gradients. It may be the most numerous shiner in turbid or polluted waters or where considerable siltation occurs. It may be present in large numbers among aquatic vegetation.[1]

Sexual maturity is usually reached at age 1 and lengths of 2 to 4 in. Spawning occurs in June in Maryland and June to late August in New

York. Eggs are attached to the undersides of solid objects, usually in clusters.[1,2]

The food of adults consists mainly of aquatic insects, but terrestrial insects and seeds were also important in Kentucky and Iowa.[2]

Brown Bullhead (*Ictalurus nebulosus*)

This bullhead originally ranged from Saskatchewan to Nova Scotia and south to Mississippi and Florida.[1] It has been widely introduced elsewhere.[5]

Brown bullheads are primarily inhabitants of warmwater ponds, impoundments, lakes, and sluggish streams. Deep, clear, weedy water is preferred, over a variety of bottom types (sand, gravel, or muck). Adults inhabit the deeper areas of the littoral zone in lakes but enter shallow areas to feed and spawn. Young are found closer to shore.[1,5]

Adults[1] are typically 4.5 to 12 in. in length and weigh 1 to 15 oz. Sexual maturity is normally reached at age 3. Water temperatures near 70°F (21.1°C) are preferred for spawning. Nests are constructed in shady areas, usually near a submerged log, stump, etc., by both parents. The depth of the nesting site and the bottom type on which it is constructed may vary considerably. Post-spawning care may be by both parents or one parent alone. Eggs reportedly hatch in 5 to 9 days at temperatures from 77° to 69°F (25.0° to 20.6°C). Females from 8 to 13 in. in length lay from 2000 to 13,000 eggs.[5]

Bluegill (*Lepomis macrochirus*)

Bluegill were originally found from Minnesota to New York, south through the Great Lakes and Mississippi drainages to the Gulf of Mexico, northeastern Mexico, and Florida, and up the coastal area to North Carolina. Widespread introductions have been made in North America, Europe, and Africa.

The largest populations occur in clear, non-flowing waters over a variety of bottom types. In heavily vegetated areas, this species, like the pumpkinseed and yellow perch, may become too numerous, resulting in a stunted population.[1,5] Little feeding and essentially no growth occurs below 10 to 13°C. The preferred temperature of juveniles in laboratory experiments[2,3] is reported to be 32.3°C.

Adults are usually 3.5 to 10 in. long.[1] Sexual maturity is reached at ages 1 to 2. Spawning occurs throughout most of the growing season (May to September in Illinois), when water temperatures are normally between 22 and 27°C. Males build nests over a variety of bottom types, mainly fine gravel, and water depths. The nest is guarded by the male after spawning. Incubation time ranges from 32 to 71 hours at water temperatures from 27.3°C to 22.6°C. Fry are approximately 4 mm long at hatching and do not leave the nest until 4 days later. A 6-in. female carries about 14,000 eggs, but since spawning may occur more than once, the actual number produced is generally much higher.[2]

At a length of 10 to 12 mm, the young bluegills take up a planktonic existence in the upper 3 m of the water body, remaining for 6 to 7 weeks while feeding on zooplankton. Copepods and *Bosmina* spp. were preferred over *Daphnia* spp. As the bluegills grow in size, larger items, such as insect larvae and amphipods, are added to the diet. Adult bluegills feed mainly on aquatic insects, small crayfish, and small fish.[2]

Redbreast Sunfish (*Lepomis auritus*)

The redbreast ranges from Maine to Texas in waters tributary to the Atlantic and Gulf of Mexico. It reportedly is found under a wide variety of environmental conditions from headwater streams to estuaries. At low winter temperatures, the redbreast (and many other species) forms hibernating schools in deeper, slower reaches.[6]

Adults may reach 10 in. in length. Sexual maturity occurs at lengths of 3 to 4 in. at ages 2 to 3. Spawning occurs from June to August in New York. Nesting behavior is similar to that of the bluegill and green sunfish.[6]

Insects are reported to be the major food item.[6]

Green Sunfish (*Lepomis cyanellus*)

This species was originally found from South Dakota through the southern Great Lakes drainage to western New York and south to New Mexico, Texas, and western Florida. It has been widely introduced outside its original range, often unintentionally.[1,5]

It generally inhabits small streams of low to moderate gradients, as well as ponds, impoundments, and natural lakes. Largest populations occur when there is little competition from other sunfish species. Green sunfish rarely become large enough to rate as a desirable panfish. They often overpopulate a water body, competing with more desirable game species for food and living space. The green sunfish is reportedly more tolerant to turbidity and siltation than most other sunfish species.[1,5]

Adults are generally 3 to 8 in. long. Sexual maturity is reached at ages 1 to 2. Spawning occurs from May to August (Illinois), when water temperatures are between 20 to 26°C. Nesting habits are similar to the bluegill. Males build nests over a variety of bottom types, mainly fine gravel, and water depths. The nest is guarded by the male after spawning. Incubation time varies from 29 to 50 hr at water temperatures from 27.6 to 23.8°C. Fry are approximately 4.5 mm long at hatching and remain in the nest for several days after.[6]

The green sunfish has a relatively large mouth and tends to consume larger food items than other sunfishes, particularly consuming juvenile fishes. Other foods include fish eggs and fry, terrestrial and aquatic insects, and crayfish.[5,6]

Pumpkinseed (*Lepomis gibbosus*)

This member of the sunfish family was originally found in southern Canada, the upper Mississippi River system, the Great Lakes region, and along the Atlantic Coast to Georgia. It has also been widely introduced elsewhere.[1,2]

Habitat preferences are similar to the bluegill's, except that dense growths of aquatic vegetation are preferred. It reportedly does not overpopulate a lake as easily as the bluegill, because of a dietary preference for a greater fraction of small fish, including its own young.[1] The preferred temperature of juveniles in laboratory experiments[3] was 31.5°C.

Adults are usually 2.5 to 10 in. long.[1] Sexual maturity is reached at ages 1 to 2. Spawning takes place from May to August.[2] Nest building starts when water temperatures reach 15°C. Details of reproduction are similar to the bluegill. Incubation time is about 3 days at 28°C. Fry at hatching are 3 mm long. A 5-in. long female produces an average of 22,000 eggs.[2]

Pumpkinseeds feed mostly on insects, crustaceans, and snails. Larger pumpkinseeds take a greater proportion of small fish.[2]

Largemouth Bass (*Micropterus salmoides*)

The range of the largemouth bass extends from South Dakota to southern Ontario and south to Florida, the Gulf States, and northeastern Mexico. It has been widely introduced elsewhere.[1]

It predominates in clear, weedy, non-flowing waters. The preferred temperature of juveniles in laboratory experiments[3] was reported to be 30 to 32°C.

Adults are generally 10 to 20 in. long.[1] Sexual maturity occurs normally at age 2. Nesting begins when water temperatures reach about 60°F (15.6°C). Nests are constructed in sand, gravel, roots, or vegetation at a median depth of 30 in. Eggs hatch in 2 to 5 days at temperatures between 72° and 66°F (21.7° and 18.9°C). Fry remain in or near the nest for 8 to 13 days. Males guard the eggs and fry. Egg production reportedly varies from 2000 to 94,000 eggs per female, depending on age, weight, and length.[5]

Fry consume zooplankton, mainly *Cyclops* and *Daphnia* spp. As they grow larger, fry add insect larvae to their diet. Adults eat mostly fish; other food items are worms, mussels, frogs, crayfish, snails, and large insects. Typical fishes in the diet are bluegills, yellow perch, and other sunfishes; threadfin shad, golden shiners, and other minnows; bullheads; darters; and small basses.[5]

Smallmouth Bass (*Micropterus dolomieu*)

The smallmouth bass was originally found from Minnesota through the Great Lakes to Quebec and south to northern Alabama and eastern Oklahoma. It has been often successfully introduced outside this range.[1,4]

The largest populations are found in large, clear lakes and cool streams of moderate-to-high gradient which have bottoms of gravel, boulder, or bedrock.[1,5] The preferred temperature of juveniles in laboratory experiments[3] was reported to be 28°C.

Adults are generally 10 to 18 in. in length.[1] Sexual maturity occurs at ages 3 to 4. Nesting begins when water temperatures reach 40 to 60°F (4.4 to 15.6°C). The male constructs a dish-shaped nest (as other sunfishes do) on sand, gravel, or rocks in water 10 in. to 12 ft deep. Spawning takes place at temperatures from 58° to 70°F (14.4° to 21.1°C). Hatchlings remain in the nest for 3 to 4 days. The male guards the young until the fry are about 1 in. long. A 15- to 17-in. long female may contain 7000 to 21,000 eggs.[5]

Smallmouth fry consume mainly zooplankton. Young fish 1 to 2 in. long eat mainly insects and small fish. Adults prefer crayfish, fish, and insects. Fishes consumed include young pickerel, yellow perch, sunfish, chubs, shiners, suckers, and their own young.[5]

Fishes of the Schuylkill River, Perkiomen Creek, and Tributaries Associated with the Limerick Generating Station

Species	Common name
Anguilla rostrata	American eel
Esox americanus[a]	Refin pickerel
Esox masquinongy[a]	Muskellunge
Carassius auratus	Goldfish
Cyprinus carpio	Carp
Exoglossum maxilingua	Cutlips minnow
Notemigonus crysoleucas	Golden shiner
Notropis amoenus	Comely shiner
Notropis analostanus	Satinfin shiner
Notropis bifrenatus[a]	Bridle shiner
Notropis cornutus	Common shiner
Notropis hudsonius	Spottail shiner
Notropis procne	Swallowtail shiner
Notropis spilopterus	Spotfin shiner
Pimephales notatus	Bluntnose minnow
Pimephales promelas	Fathead minnow
Rhinichthys atratulus	Blacknose dace
Rhinichthys cataractae	Longnose dace
Semotilus atromaculatus	Creek chub
Semotilus corporalis	Fallfish
Carpiodes cyprinus[b]	Quillback
Catostomus commersoni	White sucker
Erimyzon oblongus	Creek chubsucker
Ictalurus catus[b]	White catfish
Ictalurus melas[a]	Black bullhead
Ictalurus natalis	Yellow bullhead
Ictalurus nebulosus	Brown bullhead
Ictalurus punctatus	Channel catfish
Noturus insignis	Margined madtom
Fundulus diaphanus	Banded killifish
Ambloplites rupestris	Rock bass
Lepomis auritus	Redbreast sunfish
Lepomis cyanellus	Green sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Micropterus dolomieu	Smallmouth bass
Micropterus salmoides	Largemouth bass
Pomoxis annularis	White crappie
Pomoxis nigromaculatus	Black crappie
Etheostoma olmstedi	Tessellated darter
Perca flavescens[b]	Yellow perch
Percina peltata[a]	Shield darter

[a] Caught only in Perkiomen Creek.

[b] Caught only in Schuylkill River.

Sources: Icthyological Associates, *Schuylkill Progress Report No. 2 (Part One)*, May 1972. Icthyological Associates, *Perkiomen Progress Report No. 2 (Part One)*, June 1972.

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Common plant species of vegetational communities likely to occur in the vicinity of the Limerick site or along transmission line rights-of-way[a]

(Species from the applicant's list for the site are indicated by an asterisk)

Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
*Fraxinus americana**	x							x	x	x
*Liriodendron tulipifera**	x								x	x
*Acer rubrum**	x				x		x	x	x	
*Ulmus americana**	x							x	x	
Eupatorium purpureum	x			x		x		x		
Rudbeckia laciniata	x			x		x		x		
*Ambrosia trifida**	x		x		x					
Aster spp.	x	x								
Solidago spp.	x	x								
Betula lutea	x									
Chelone glabra	x									
Rubus spp.*	x									
*Daucus carota**		x	x	x						
*Melilotus alba**		x	x	x						
*Trifolium hybridum**		x		x						
Amaranthus spinosus		x	x							
*Ambrosia artemisiifoli**		x	x							
Arctium lappa		x	x							
Atriplex patula var. *hastata*		x	x							
Bidens connata		x	x							
Carduus lanceolatus		x	x							
*Chenopodium albun**		x	x							
*Cichorium intybus**		x	x							
Datura stramonium		x	x							
Helianthus annuus		x	x							
*Lactuca scariola**		x	x							
*Lepidium virginicum**		x	x							
*Linaria vulgaris**		x	x							
*Cenothera biennis**		x	x							

Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
Panicum capillare		x	x							
Plantago rugelii		x	x							
*Rumex crispus**		x	x							
*Rumex obtusifolius**		x	x							
Setria glauca		x	x							
*Verbascum thapsus**		x	x							
Xanthium chinese		x	x							
Amaranthus albus		x								
Citrullus vulgaris		x								
*Melilotus officinalis**		x								
Populus alba		x								
*Rhus radicans**			x					x		x
Commelina virginica			x			x				
Allium vineale			x	x	x					
Phleum pratense			x	x						
*Phytolacca americana**			x	x						
*Trifolium pratense**			x	x						
Trifolium repens			x	x						
*Achillea millefolium**			x	x						
*Barbarae vulgaris**			x	x						
Bidens bipinnata			x	x						
*Chrysanthemum leucanthemum**			x	x						
*Hypericum perforatum**			x	x						
*Polygonum pensylvanicum**			x	x						
*Taraxacum officinale**			x	x						
*Abutilon theophrasti**			x							
Agropyron repens			x							
Amaranthus graecizans			x							
Anthemis arvensis			x							
*Anthemis cotula**			x							
*Asclepias syriaca**			x							

Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
*Asparagus officinalis**			x							
Carduus arvensis (Cnicus arvensis)			x							
Cerastium viscosum			x							
Cerastium vulgatum			x							
*Convolvulus arvensis**			x							
*Cenvolvulus sepium**			x							
Eleusine indica			x							
*Equisetum arvense**			x							
*Erigeron annuus**			x							
Euphorbia cyparissias			x							
Mollugo verticillata			x							
*Oxalis stricta**			x							
*Plantago lanceolata**			x							
Polygonum aviculare			x							
Polygonum persicaria			x							
Portulacca oleracea			x							
*Rhus glabra**			x							
*Rudbeckia hirta**			x							
*Rumex acetosella**			x							
*Saponaria officialis**			x							
*Solanum carolinense**			x							
*Trifolium arvense**			x							
*Verbascum blattaria**			x							
Verbena hastata			x							
*Geranium maculatum**				x					x	x
*Podphyllum peltatum**				x						x
Cimicifuga racemosa				x					x	
Dicentra cucullaria				x					x	
Hydrophyllum virginianum				x					x	
*Heracleum maximum**				x	x	x		x		
Cardamine bulbosa				x		x		x		

Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
Symplocarpus foetidus				x		x		x		
*Impatiens capensis**				x	x			x		
*Thalictrum polygamum**				x	x			x		
Clematis virginiana				x				x		
Valerinella chenopodifolia				x				x		
Mentha spicata				x		x				
*Veratrum viride**				x		x				
*Cicuta maculata**				x	x					
Agrostis alba				x						
Andropogon virginicus				x						
Anthoxanthum odoratum				x						
*Arisaema triphyllum**				x						
Bidens frondosa				x						
Bidens laevis				x						
Botrychium simplex var. *tenebrosum*				x						
(*Botrychium tenebrosum*)				x						
Capsella bursa-pastoris				x						
Carex spp.				x						
Carex interior				x						
Carex muricata				x						
Cyperus strigosus				x						
*Dactylis glomerata**				x						
Drosera rotundifolia				x						
Dryopteris goldiana				x						
Erythronium americanum				x						
Eupatorium perfoliatum				x						
Glechoma hederacea (*Nepeta glechoma*)*				x						
Hedeoma pulegioides				x						
Iris versicolor				x						
Juncus spp.				x						
Lobelia cardinalis				x						

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Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
Lobelia nuttallii				x						
Lobelia siphilitica				x						
*Lolium perenne**				x						
Lycopodium lucidulum				x						
Lysimachia ciliata				x						
*Lysimachia quadrifolia**				x						
Melanthium virginicum				x						
Milulus ringens				x						
Monarda fistulosa				x						
Muhlenbergia racemosa				x						
*Myosotis scorpioides**				x						
*Nepeta cataria**				x						
Ophioglossum vulgatum				x						
Origanum vulgare				x						
Panicum flexile				x						
Poa annua				x						
Poa compressa				x						
*Poa pratensis**				x						
Polygala senega				x						
Polygonum scadens				x						
*Prunella vulgaris**				x						
*Ranunculus bulbosus**				x						
Ranunculus septentrionalis				x						
Rhus vernix				x						
Rhynchospora alba				x						
Salvia lyrata				x						
Samolus parviflorus				x						
Scirpus spp.				x						
Scleria pauciflora				x						
Senecio aureus				x						
Sium suave				x						
*Specularia perfoliata**				x						

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Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
*Stellaria media**				x						
Tradescantia virginia				x						
Trifolium agrarium				x						
*Trifolium procumbens**				x						
Uvularia perfoliata				x						
Vaccinium macrocarpon				x						
Viola spp.				x						
*Platanus occidentalis**					x		x	x		
Cephalanthus occidentalis					x			x		
*Onoclea sensibilis**					x	x				
Agrimonia parviflora					x					
Alnus serrulata					x					
*Asclepias incarnata**					x					
Fraxinus sp.					x					
*Gloditsia triacanthos**					x					
Hibiscus moscheutos					x					
Jussiaea repens var. *glabrescens*					x					
*Liquidambar styraciflua**					x					
Ludwigia alternifolia					x					
Salix alba					x					
Sambucus sp.					x					
Stachys palustris					x					
Vernonia noveboracensis						x		x		
Osmunda cinnamomea						x				
Osmunda claytoniana						x				
Osmunda regalis						x				
Polygonum sagittatum						x				
*Quercus alba**							x		x	x
*Acer negundo**							x	x		
*Acer saccharinum**							x	x		
*Quercus bicolor**							x	x		

Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
Betula nigra							x			
Salix spp.							x			
*Parthenocissus quinquefolia**								x		x
*Lindera benzoin**								x	x	
Viburum dentatum								x	x	
Actinomeris alternifolia								x		
Aesculus glabra								x		
Aesculus octarda								x		
Alnus rugosa								x		
Aster prenanthoides								x		
Conium maculatum								x		
Cornus amomum								x		
Helianthus decapetalus								x		
Mertensia virginica								x		
Phacelia purshii								x		
Phlox paniculata								x		
Physocarpus opulifolius								x		
Polemonium reptans								x		
Polygonum arifolium								x		
Quercus imbricaria								x		
Quercus macrocarpa								x		
Salix cordata								x		
*Salix nigra**								x		
Trillium sessile								x		
Viola striata								x		
Vitis riparia								x		
*Amelanchier canadensis**										
*Carya glabra**									x	x
Carya tomentosa									x	x
Claytonia virginica									x	x
Cornus florida									x	x

Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
Dentaria laciniata										
Euonymus atropurpureus									x	x
*Hamamelis virginiana**									x	x
*Hepatica americana**									x	x
*Juglans nigra**									x	x
*Ostrya virginiana**									x	x
*Prunus serotina**									x	x
*Quercus rubra**									x	x
*Quercus velutina**									x	x
Rubus allegheniensis									x	x
*Sanguinaria canadensis**									x	x
*Staphylea trifolia**									x	x
*Viburnum acerifolium**									x	x
Vitis aestivalis var. *argentifolia*									x	x
Acer nigrum									x	x
*Acer saccharum**									x	
Allium tricoccum									x	
*Asarum canadense**									x	
Aster divaricatus									x	
*Botrychium virginianum**									x	
Carya cordiformis									x	
Caulophyllum thalictroides									x	
Cornus alternifolia									x	
*Cryptotaenia canadensis**									x	
Delphinium tricorne									x	
Dryopteris intermedia									x	
Dryopteris marginalis									x	
Eupatorium rugosum									x	
*Fagus grandifolia**									x	
Hydrangea arborescens									x	
*Juglans cinerea**									x	
									x	

Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
Laportea canadensis										
Osmorhiza longistylis									x	
Phlox divaricata									x	
Pinus strobus									x	
*Polystichum acrostichoides**									x	
*Rubus occidentalis**									x	
Rubus odoratus									x	
*Sambucus canadensis**									x	
*Sassafras albidum**									x	
Sedum ternatum									x	
*Smilacina racemosa**									x	
*Smilax rotundifolia**									x	
Stellaria pubera									x	
Thalictrum dioicum									x	
*Tilia americana**									x	
Trillium erectum									x	
Trillium grandiflorum									x	
Trillium nivale									x	
Tsuga canadensis									x	
Anemonella thalictroides									x	
Arabis laevigata										x
Aster undulatus										x
*Carya ovata**										x
Castanea dentata										x
Cercis canadensis										x
Claytonia caroliniana										x
Corylus americana										x
Desmodium nudiflorum										x
*Hieracium venosum**										x
*Houstonia caerulea**										x
Kalmia latifolia										x
										x

Species	Habitat									
	Successional areas				Wetlands		Forests (types)			
	Weedy fields	Dumps	Road-sides	Pastures	Tidal marshes	Swamps	River birch and swamp maple (red maple)	Sycamore, Amer. elm, and silver maple	Red oak, basswood, and white ash	White oak
Malus coronaria										x
Myssa sylvatica										x
Pyrola elliptica										x
Quercus coccinea										x
Ribes cynosbati										x
Saxifraga virginiensis										x
Solidago bicolor										x

[a]Sources:

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Plant species native to North America found by the applicant on the site

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Aletris sp.
Allium canadense
Allium cernuum Roth
Anemone virginiana
Apocynum cannabinum
Asclepias tuberosa
Asclepias variegata
Baptisia alba
Carex stipata
Cassia fasciculata
Centaurea americana
Circaea quadrisulcata var. *camademsos*
Cirsium pumilum
Cornus stolonifera
Cotinus obovatus
Crataegus prinosa
Cyperus esculentus
Delphinium exaltatum
Dennstaedtia punctilobula
Desmodium paniculatum
Eupatorium fistulosum
Eupatorium maculatum
Galium asprellum
Galium triflorum
Gaylussacia baccata
Geum canadense
Helianthus divaricatus
Impatiens pallida
Juncus effusus
Juniperus virginiana
Lactuca canadensis
Menispermum canadense
Monarda didyma
Monotropa uniflora
Morus rubra
Phryma leptostachya
Physalis heterophylla
Pinus banksiana
Pinus resinosa
Polygonatum spp.
Populus grandidentata
Potentilla argentea
Potentilla canadensis
Potentilla simplex
Quercus ilicifolia
Quercus palustris
Quercus prinus
Rhus typhina
Rosa carolina
Silene antirrhina
Silene cucubalus
Silene stellata
Solidago canadensis
Solidago curtissi
Solidago graminifolia
Sonchus asper
Stachys hyssopifolia var. *ambigua*
Teucrium canadense
Thuja occidentlais
Tiarella cordifolia
Ulmus rubra
Urtica gracilis
Vaccinium angustifolium
Verbena urticifolia
Viola papilionaceae
Viola triloba
Vitis vulpina

Introduced plant species (escapes from cultivation) found by the applicant on the site

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Ailanthus altissima
Albizzia sp.
Alliaria officinalis
Amaranthus hybridus
Amorpha fruticosa
Aquilegia vulgaris
Arctium minus
Berberis thunbergii
Brassica nigra
Castanea mollissima
Catalpa sp.
Chelidonium majus
Cirsium arvense
Commelina communis var. *ludens*
Cymbalaria muralis
Dianthus armeria
Digitaria sanguinalis
Dipsacus sylvestris
Duchesnea indica
Echinochloa crusgalli
Fragaria vesca
Galinsoga parviflora
Galium mollugo
Geranium pusillum
Hederanthera spp.
Hemerocallis fulva
Hesperis matronalis
Hibiscus trionum
Ipomoea coccinea
Ipomoea hederacea
Ipomoea purpurea
Lamium purpureum
Lepidium campestre
Lepidium ruderale
Lonicera japonica halliana
Lychnis alba
Maclura pomifera
Malva meschata
Malva neglecta
Mirabilis jalapa
Nasturtium officinale
Penstemon hirsutus
Pinus sylvestris
Plantago major
Polygonum cespitosum var. *longisetum*
Portulaca spp.
Potentilla recta
Prunus persica
Prunus virginiana
Pyrus communis
Pyrus malus
Robinia pseudoacacia
Rosa multiflora
Rubus phoenicolasius
Sisymbrium altissimum
Solanum dulcamara
Sonchus arvensis
Stellaria graminea
Syringa vulgaris
Taxus cuspidata
Thlaspi arvense
Tragopogon pratensis
Urtica dioica
Vicia cracca
Vinca minor

Mosses and lichens found by the applicant on the site

Hairy cap moss
Parmelia rudecta
Pin cushion moss
Powderhorn lichen
Pyxie cup moss

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Mammals whose ranges include the vicinity of the Limerick site[a]

(Species sighted at the Limerick site are indicated by an asterisk)

Scientific and common names	Habitat preference									
								Forests		
	Rivers	Streams	Ponds	Marshes	Swamps	Urban	Rural	Oak-pine	Deciduous	Riparian
Condylura cristata cristata Star-nosed Mole		x	x	x	x		Grasslands x			x
Didelphis marsupialis virginiana Common opossum*		x					Woodlots x	x	x	x
Sorex fumeus fumeus Smoky shrew				x			Woodlots x	x	x	Hemlock forests x
Blarina brevicauda kirtlandi Short-tailed shrew*				x			x	x	x	x
Parascalops breweri Hairy-tailed mole						x	x	x	x	x
Myotis keenii septentrionalis Keen's myotis						Buildings x	Caves, buildings x	Caves x	Caves x	Caves x
Myotis lucifugus lucifugus Little Brown bat						Buildings x	Caves, Buildings x	Caves x	Caves x	Caves x
Myotis leibii leibii Small-footed myotis						Buildings x	Caves, buildings x	Caves x	Caves x	Caves x
Pipistrellus subflavus subflavus Eastern pipistrelle						Buildings x	Caves, buildings x	Caves x	Caves x	Caves x
Eptesicus fuscus fuscus Big Brown bat						Buildings x	Caves, buildings x	Caves x	Caves x	Caves x
Lasiurus borealis borealis Northern red bat*						Shade trees x	Woodlots x	x	x	x
Sorex cinereus fontinalis Masked shrew							x	x	x	x

Scientific and common names	Habitat preference									
	Rivers	Streams	Ponds	Marshes	Swamps	Urban	Rural	Forests		
								Oak-pine	Deciduous	Riparian
Lasionycteris noctivagans Silver-haired Bat							Woodlots x	x	x	x
Lasiurus seminolus Seminole Bat							Woodlots x	x	x	x
Lasiurus cinereus cinereus Hoary bat							Woodlots x	x	x	x
Procyon lotor lotor Eastern raccoon*							Woodlots x	x	x	x
Mustela frenata noveboracensis Long-tailed weasel*							x	x	x	x
Mephitis mephitis nigra Eastern skunk*							x	x	x	x
Vulpes fulva fulva Eastern red fox*							x	x	x	x
Ucrocyon cinereoargenteus cinereoargenteus Eastern gray fox							Woodlots x	x	x	x
Tamias striatus fisheri Fisher's chipmunk*							Fencerows, woodlots x	x	x	x
Sciurus carolinensis pennsylvanicus Northern gray squirrel*							Woodlots x	x	x	x
Tamiasciurus hudsonicus loquax Southern red squirrel*							Conifer plantations x	x	x	x
Glaucomys volans volans Eastern flying squirrel							Woodlots x	x	x	x
Peromyscus leucopus noveboracensis Fischer's deer mouse*							x	x	x	x
Pitymys pinetorum scalopsoides Northern pine mouse							Woodlots x	x	x	x
Sylvilagus transitionalis New England cottontail							Brushy areas, woodlots x	x	x	x

Scientific and common names	Habitat preference									
	Rivers	Streams	Ponds	Marshes	Swamps	Urban	Rural	Forests		
								Oak-pine	Deciduous	Riparian
Zapus hudsonius americanus Meadow jumping mouse							Meadows, grainfields x			
Lepus europaeus hybridus European hare							x			
Sylvilagus floridanus mallurus Eastern cottontail*							x			

*Sources:

W. H. Burt and R. P. Grussenheider, *A Field Guide to the Mammals*, 2nd ed., Houghton Mifflin Company, Boston, Mass., 1964.

H. H. Collins, Jr., *Complete Field Guide to American Wildlife: East, Central, and North*, Murray Printing Company, Forage Village, Mass., 1959.

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Philadelphia Electric Company, *Applicant's Environmental Report – Construction Permit Stage (Revised), Limerick Generating Station Units 1 and 2, Supplement No. 2*, September 1972.

H. A. Roberts and R. C. Early, *Mammal Survey of Southeastern Pennsylvania*, Pennsylvania Game Commission, Harrisburg, 1952.

Scientific and common names	Habitat preference									
								Forests		
	Rivers	Streams	Ponds	Marshes	Swamps	Urban	Rural	Oak-pine	Deciduous	Riparian
Odocoileus virginianus borealis Northern white-tailed deer*							x	x	x	x
Ondatra zibethica zibethica Common muskrat*		x	x	x						
Rattus norvegicus Norway rat*		x				x	x			
Cryptotis parva parva Little short-tailed shrew				x	x		Meadows x			
Clethrionomys gapperi rupicola Red-backed mouse								x	x	x
Mustela vison mink Southeastern mink		x								x
Scalopus aquaticus aquaticus Eastern mole						x	x			
Mus musculus domesticus House mouse*						x	x			
Lepus americanus virginianus Varying hare								x	x	
Marmota monax monax Southeastern woodchuck*							x			
Synaptomys cooperi stonei Southern bog lemming							Dry hillside fields x			
Microtus pennsylvanicus pennsylvanicus Pennsylvania meadow mouse							Unpastured meadows, swales x			

Reptiles and amphibians whose ranges include the vicinity of the Limerick site[a]

(Species sighted at the Limerick site are indicated by an asterisk)

Scientific and common names	Habitat preference									
								Forests		
	Rivers	Streams	Ponds	Marshes	Swamps	Urban	Rural	Oak-pine	Deciduous	Riparian
Clemmys insculpta Wood turtle		x	x	x	x		x	x	x	x
Thamnophis sirtalis sirtalis Garter snake*		x		x	x	x	x	x	x	x
Bufo americanus americanus American toad*			x			x	x	x	x	x
Bufo woodhousii fowleri Fowler's toad			x			x	x	x	x	x
Chelydra serpentina serpentina Common snapping turtle*	x	x	x	x	x					
Thamnophis sauritus sauritus Ribbon snake		x	x	x	x		x			
Pseudacris nigrita feriarum Eastern chorus frog			x	x	x		x			x
Storeria dekayi dekayi DeKay's snake				x	x	x	x			x
Rana catesbeiana Bullfrog*	x	x	x				x			
Triturus viridescens viridescens Common newt		x	x	x	x					
Clemmys guttata Spotted turtle		x	x	x	x					
Clemmys muhlenbergii Muhlenberg's turtle		x	x	Bogs x	x					
Natrix sipedon sipedon Water snake*		x	x	x	x					
Kinosternon subrubrum subrubrum Common mud turtle		x	x	x			x			
Hyla crucifer crucifer Spring peeper*			x	x	x		x			
Rana pipiens pipiens Northern leopard frog*			x	x	x		x			

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Scientific and common names	Habitat preference									
	Rivers	Streams	Ponds	Marshes	Swamps	Urban	Rural	Forests		
								Oak-pine	Deciduous	Riparian
Natrix kirtlandi Kirtland's snake				x	x		x			x
Hyla versicolor versicolor Gray tree frog							x	x	x	x
Ambystoma tigrinum tigrinum Eastern tiger salamander							x	x	x	x
Terrapene carolina carolina Common box turtle*							x	x	x	x
Eumeces fasciatus Common five-lined skink							x	x	x	x
Carphophis amoenus amoenus Worm snake, Ground snake							x	x	x	x
Diadophis punctatus edwardsi Eastern ring-necked snake*							x	x	x	x
Elaphe obsoleta obsoleta Pilot black snake							x	x	x	x
Haldea valeriae valeriae Valeria's snake							x	x	x	x
Lampropeltis doliata triangulum Milk snake							x	x	x	x
Storeria occipitomaculata occipitomac Red-bellied snake							x	x	x	x
Necturus maculosus maculosus Mudpuppy, waterdog	x	x	x							
Sternotherus odoratus Common Musk turtle	x	x	x							
Pseudemys rubriventris rubriventris Red-bellied turtle	x	x	x							
Natrix septemvittata Queen snake	x	x	x							
Chrysemys picta picta Eastern painted turtle*		x	x	x						

Scientific and common names	Habitat preference									
	Rivers	Streams	Ponds	Marshes	Swamps	Urban	Rural	Forests		
								Oak-pine	Deciduous	Riparian
Chrysemys picta marginata Midland painted turtle		x	x	x						
Rana clamitans melanota Green frog*		x	x		x					
Rana palustris Pickerel frog*		x	x				x			
Desmognathus fuscus fuscus Northern dusky salamander*		x			x					Wooded streams x
Crotalus horridus horridus Rattlesnake					x			x	x	
Sceloporus undulatus hyacinthinus Northern fence lizard							x	x	x	
Heterodon platyrhinos platyrhino Spreading adder							x	x	x	
Plethodon cinereus cinereus Eastern red-backed salamander*								x	x	x
Plethodon glutinosus glutinosus Slimy salamander								x	x	x
Ancistrodon contortrix mokeson Copperhead								x	x	x
Cryptobranchus alleganiensis Hellbender	x	x								
Pseudotriton ruber ruber Northern red salamander		x								Wooded streams x
Rana sylvatica sylvatica Wood frog					x					x
Ambystoma opacum Marbled salamander					x					x
Hemidactylium scutatum Eastern four-toed salamander					x					Boggy woodland ponds x

Scientific and common names	Habitat preference									
	Rivers	Streams	Ponds	Marshes	Swamps	Urban	Rural	Forests		
								Oak-pine	Deciduous	Riparian
Coluber constrictor constrictor										
Black snake, black racer					x		x			
Opheodrys vernalis vernalis										
Green snake							x			Wooded streams
Ambystoma maculatum										x
Spotted salamander[a]									x	x
Ambystoma jeffersonianum										
Jefferson's salamander									x	x
Graptemys geographica	x									
Common map turtle										
Gyrinophilus porphyriticus porphyritious		x								
Northeastern purple salamander[a]										
Eurycea bislineata bislineata		x								
Northern two lined salamander[a]										
Eurycea longicauda longicauda										
Long-tailed salamander[a]										Wooded streams x

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[a] Sources:

S. C. Bishop, *Handbook of Salamanders: The Salamanders of the United States, of Canada, and of Lower California*, Hafner Publishing Company, New York, 1962.

A. Carr, *Handbook of Turtles: The Turtles of the United States, Canada, and Baja California*, Comstock Publishing Company, Ithaca, N.Y., 1952.
H. H. Collins, Jr., *Complete Field Guide to American Wildlife: East, Central, and North*, Murray Printing Company, Forage Village, Mass., 1959.
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Philadelphia Electric Company, *Applicant's Environmental Report – Construction Permit Stage (Revised), Limerick Generation Station Units 1 and 2*, May 1972.

Philadelphia Electric Company, *Applicant's Environmental Report – Construction Permit Stage (Revised), Limerick Generating Station Units 1 and 2, Supplement. No. 2*, September 1972.
H. M. Smith, *Handbook of Lizards of The United States and of Canada*, Comstock Publishing Company, Ithaca, N.Y., 1946.
A. H. Wright and A. A. Wright, *Handbook of Frogs and Toads of the United States and Canada*, Comstock Publishing Company, Ithaca, N.Y., 1949.
A. H. Wright and A. A. Wright, *Handbook of Snakes of The United States and Canada*, vols. I and II, Comstock Publishing Associates, Ithaca, N.Y., 1957.

Aquatic birds whose nesting or wintering ranges include the vicinity of the Limerick site[a, b]

(Species sighted at the Limerick site are indicated by an asterisk)

S, summer; W, winter; Y, year-round

A, abundant; VC, very common; FC, fairly common; RC, rather common; C, common; UC, uncommon; RV, regular visitor; R, rare

Scientific and common names	Time of residence	Abundance	Habitat preference							
			Rivers	Streams	Ponds	Marshes	Swamps	Riparian forests	Urban	Rural
Casmerodius albus Common egret*	S	C	Mud flats	x	x	x				
Anas platyrhynchos Mallard*	Y	C	x		x	x				Grainfields
Fulica americana American coot	Y	C	x		x	x				Fields
Plegadis falcinellus European glossy ibis	S	UC	Mud flats		x	x				Wet fields
Butorides virescens Green heron	S	C		Slow streams	Small ponds	x		Wooded		
Lophodytes cucullatus Hooded merganser	W	UC	x	x	x					
Anas carolinesis Green-winged teal*	W	C	x		x	x				
Aythya collaris Ring-necked duck	W	C	x		x	x				
Oxyura jamaicensis Ruddy duck	W	C	x		x	x				
Anas strepera Gadwall	W	UC	x		x	x				
Charadrius vociferus Killdeer*	Y	VC	Mud flats, bands						Parks, lawns	Fields, pastures
Larus delawarensis Ring-billed gull	W	C	x						Refuse dumps, cities	Fields

Scientific and common names	Time residence	Abundance	Habitat preference							
			Rivers	Streams	Ponds	Marshes	Swamps	Riparian forests	Urban	Rural
Anas acuta										
Pintail	W	C			x	x				Grainfields
Aix sponsa										
Wood duck	S	C			x		x	Wooded streams		
Megaceryle alcyon										
Belted kingfisher*	Y	C	x		x					
Bucephala albeola										
Bufflehead	W	C	x		x					
Mergus merganser										
Common merganser	W	C	x		x					
Anas rubripes										
Black duck*	Y	A	x			x				
Actitis macularia										
Spotted sandpiper	S	VC		Streamsides	x					
Ardea herodias										
Great blue heron*	C		x		x					
Gallinula chloropus										
Common gallinuls, Florida gallinu	S	C			Weedy ponds	x				
Leucophoyx thula										
Snowy egret	S	C			x	x				
Aythya affinis										
Lesser scaup	W	A			x	x				
Mareca americana										
Baldpate, American widgeon	W	C			x	x				
Mareca penelope										
European widgeon	W	RV			x	x				
Nycticorax nycticorax										
Black-crowned night heron	Y	C				x	x			

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Scientific and common names	Time residence	Abundance	Habitat preference							
			Rivers	Streams	Ponds	Marshes	Swamps	Riparian forests	Urban	Rural
Rallus elegans										
King rail	Y	C				x	x			
Ixobrychus exilis										
Least bittern	S	C				x	x			
Nyctanassa violacea										
Yellow-crowned night heron	S	C				x	x			
Porzana carolina										
Sora	S	C				x				Wet meadows
Branta canadensis										
Canada goose*	W	C				x				Grainfields
Philohela minor										
American woodcock	S	RC					Wet thickets x	Moist woods		
Phalacrocorax auritus										
Double-crested cormorant	Y	C	x							
Aythya marila										
Greater scaup	W	C	x							
Bucephala clangula										
Common goldeneye	W	C	x							
Larus philadelphia										
Bonaparte's gull	W	C	x							
Podilymbus podiceps										
Pied-billed grebe	Y	FC			Shallows					
Podiceps auritus										
Horned grebe	W	C			x					
Botaurus lentiginosus										
American bittern	Y	RC				x				
Rallus limicola										
Virginia rail	Y	C				x				

Scientific and common names	Time residence	Abundance	Habitat preference							
			Rivers	Streams	Ponds	Marshes	Swamps	Riparian forests	Urban	Rural
Florida caerulea Little blue heron	S	C				x				
Porzana jamaicensis Black rail	S	R				Grassy edges				

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[a] Aquatic birds that occur only in habitats not found at the Limerick site or along transmission line rights-of-way are not included.

[b] Sources:

W. F. Blair, A. P. Blair, P. Brodkorb, F. R. Cagle, and G. A. Moore, *Vertebrates of The United States*, McGraw-Hill, New York, 1957.

H. H. Collins, Jr., *Complete Field Guide to American Wildlife: East, Central and North*, Murray Printing Company, Forage Village, Mass. 1959 The Riverside Press, Cambridge Mass. 1963.

R. T. Peterson, *A Field Guide to Western Birds*. 2nd ed., Riverside Press, Cambridge Mass. 1961.

Philadelphia Electric Company, *Applicant's Environmental Report – Construction Permit stage (Revised), Limerick Generation Station Units 1 and 2*, May 1972.

Philadelphia Electric Company, *Applicant's Environmental Report – Construction Permit stage (Revised), Limerick Generating Station Units 1 and 2, Supplement No. 2*, September 1972.

C. S. Robbins, B. Brun and H. S. Zim, *A Guide to Field Identification Birds of North America*, Golden Press, New York, 1966.

Land birds (excluding perching birds) whose nesting or wintering ranges include the vicinity of the Limerick site[a,b]
(Species sighted at the Limerick site are indicated by an asterisk)

S, summer; W, winter; Y, year-round
A, abundant; FC, fairly common; C, common; LC, locally common; UC, uncommon; R, rare

Scientific and common names	Time of residence	Abundance	Habitat preference							
			Wetlands					Forests		
			Rivers	Streams	Marshes	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Bubo virginianus Great horned owl	Y	C		Streamsides			Open areas, thickets	x	x	x
Zenaidura macroura Mourning dove*	Y	C				x	Grasslands, farmlands	Open woods	Open woods	Open woods
Colaptes auratus Yellow-shafted flicker*	Y	C				x	Farms, open areas, groves	x	x	x
Melanerpes carolinus Red-bellied woodpecker	Y	UC				x	Groves	x	x	x
Otus asio Screech owl	Y	C				Towns, trees	Groves, orchards	x	x	Wooded canyons
Tyto alba Barn owl*	Y	UC				x	Farms, fields, groves	x	x	x
Dendrocopos pubescens Downy woodpecker*	Y	C				Suburbs, shade trees	Orchards		x	x
Buteo jamaicensis Red-tailed hawk*	Y	C								
Buteo platypterus Broad-winged hawk	S	C					Open areas	x	x	x
Coccyzus erythropthalmus Black-billed cuckoo	S	C					Groves	x	x	x
							Thickets, groves	Edges	Edges	Edges
Caprimulgus vociferus Whip-poor-will	S	C					Oak thickets	x	x	Wooded canyons

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Scientific and common names	Time of residence	Abundance	Habitat preference							
			Wetlands					Forests		
			Rivers	Streams	Marshes	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Asio flammeus										
Short-eared owl	W	LC	Sloughs		x		Irrigated lands			
Chordeiles minor										
Common nighthawk, Booming nighthawk*	S	C				Open air over cities	Grasslands, open air over country-side	Open pine-woods		
Melanerpes erythrocephalus										
Red-headed woodpecker	Y	UC				Towns, scattered trees	Farms, groves		Open woods	
Falco sparverius										
Sparrow hawk*	Y	C				x	Open farmland			Wooded streams
Sphyrapicus varius										
Yellow-bellied sapsucker*	W	C					Orchards groves	x	x	
Accipiter striatus										
Sharp-shinned hawk	Y	FC						x	x	x
Dendrocopos villosus										
Hairy woodpecker*	Y	FC						x	x	x
Strix varia										
Barred owl	Y	C						x	x	Wooded river bottoms
Accipiter cooperii										
Cooper's hawk	Y	UC						Open woodlands	Open woodlands	River groves
Accipiter gentilis										
Goshawk	W	UC-R						x	x	x
Asio otus										
Long-eared owl	W	LC						x	x	Willow thickets, river woods
Circus cyaneus										
Marsh hawk*	Y	C			x		Fields, grasslands			

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Scientific and common names	Time of residence	Abundance	Habitat preference							
			Wetlands					Forests		
			Rivers	Streams	Marshes	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Buteo lagopus Rough-legged hawk	W	UC			x		Open areas			
Columba livia Rock dove, Domestic pigeon*	Y	C				City parks	x			
Chaetura pelagica Chimmney swift*	S	C				x	Open areas			
Colinus virginianus Bob-white*	Y	A					Roadsides, brushy open country	Open pinelands		
Dryoccopus pileatus Pileated woodpecker	Y	UC						x	x	
Caprimulgus carolinensis Chuck-will's-widow	S	C						Southeast pinewoods	x	
Haliaeetus leucocephalus Bald eagle	W	C	x							
Coragyps atratus Black vulture	Y	C				Garbage, towns				
Archilochus colubris Ruby-throated hummingbird*	S	C				Gardens				
Aegolius acadicus Saw-whet owl	Y	C					Groves, conifers			
Cathartes aura Turkey vulture*	Y	C					Fields, roadsides			
Phasianus colchicus Ring-necked pheasant	Y	C					x			
Aquila chrysaetos Golden eagle	W	R					Grasslands			

Scientific and common names	Time of residence	Abundance	Habitat preference							
			Wetlands					Forests		
			Rivers	Streams	Marshes	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Buteo lineatus Red-shouldered hawk	Y	C								Moist woodlands
Coccyzus americanus Yellow-billed cuckoo	S	C								River thickets

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[a] Land birds that occur only in habitats not found at the Limerick site or along transmission line rights-of-way are not included.

[b] Sources:

W. F. Blair, A. P. Blair, P. Brodkorb, F. R. Cagle, and G. A. Moore, *Vertebrates of The United States*, McGraw-Hill, New York, 1957.

H. H. Collins, Jr., *Complete Field Guide to American Wildlife: East, Central and North*, Murray printing company, Forage Village, Mass. 1959.

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C. S. Robbins, B. Brun and H. S. Zim, *A Guide to Field Identification Birds of North America*, Golden Press, New York, 1966.

Perching birds whose nesting or wintering ranges include the vicinity of the Limerick site[a,b]

(Species sighted at the Limerick site are indicated by an asterisk)

S, summer; W, winter; Y, year-round

A, abundant; LA, locally abundant; C, common; FC, fairly common; LC, locally common; UC, uncommon; R, rare; IR, irregular

Scientific and common names	Time of residence	Abundance	Habitat preference								
			Wetlands						Forests		
			Rivers	Streams	Marshes	Swamps	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Turdus migratorius Robin*	Y	C		Streamsides			Towns, lawns	Orchards, farmlands	Open woods	Open woods	Moist woods
Corvus brachyrhynchos Common crow*	Y	A	Banks					x	x	x	River groves
Parus carolinensis Carolina chickadee*	Y	FC					x	Groves	x	x	x
Sitta carolinensis White-breasted nuthatch*	Y	C					Shade trees	Groves	x	x	x
Parus bicolor Tufted titmouse*	Y	C					Shade trees	Groves	x	x	x
Carpodacus mexicanus House finch	W	A					x	x	Open woods	Open woods	Canyons
Dendroica coronata Myrtle warbler	W	C					Gardens	Brush	x	x	River thickets
Passerella iliaca Fox sparrow	W	C					Parks, gardens	Groves	Woodland undergrowth	Woodland undergrowth	Woodland undergrowth
Sitta canadensis Red-breasted nuthatch	W	C					Trees	Groves	x	x	x
Parus atricapillus Black-capped chickadee*	W	C					Gardens	Groves	Edges, woods	Edges, woods	Edges, woods
Vireo olivaceus Red-eyed vireo	S	A					Shade trees	Groves	x	x	x
Spizella passerina Chipping sparrow*	S	C					x	Farms, orchards, conifer-plantations	Open woodlands	Open woodlands	Open woodlands

Scientific and common names	Time of residence	Abundance	Habitat preference								
			Wetlands						Forests		
			Rivers	Streams	Marshes	Swamps	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Piranga rubra Summer tanager	S	C					x	Groves	x	x	River groves
Icterus galbula Baltimore oriole*	S	C					Shade trees	Groves	x	x	x
Vireo gilvus Warbling vireo	S	C					Shade trees	Groves	x	x	Poplars
Hylocichla mustelina Wood thrush*	S	C					Suburbs	Shady thickets	x	x	x
Troglodytes aedon House wren*	S	C					Gardens	Thickets, brush	Open woods	Open woods	Open woods
Geothlypis trichas Maryland yellowthroat*	S	A		Streamsides		x	x		Wet thickets		
Dendroica petechia Yellow warbler*	S	C		Streamsides			Suburban shrubs, shade trees	Orchards			Willows, poplars
Hylocichla guttata Hermit thrush	W	C					Parks	Thickets	x	Forest floors	
Vireo flavifrons Yellow-throated vireo	S	UC					Shade trees		x	x	x
Carpodacus purpureus Purple finch	W	C					Suburbs		x	x	x
Zonotrichia albicollis White-throated sparrow*	Y	A						Thickets	Woodland undergrowth	Woodland undergrowth	Woodland undergrowth
Cyanocitta cristata Blue jay*	Y	C						Groves, farms	x	x	x
Bombycilla cedrorus Cedar waxwing*	Y	IR						Fruit trees, orchards	Open woods	Open woods	Open woods

Scientific and common names	Time of residence	Abundance	Habitat preference								
			Wetlands						Forests		
			Rivers	Streams	Marshes	Swamps	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Myiarchus crinitus											
Great crested flycatcher*	S	C						Groves, orchards	x	x	x
Contopus virens											
Eastern wood pewee*	S	C						Groves	x	x	x
Mniotilta varia											
Black-and-white warbler	S	C						Undergrowth	x	x	x
Parula americana											
Parula warbler	S	C						Groves	x	x	x
Dendroica dominica											
Yellow-throated warbler	S	C						Groves	Open woodlands	Open woodlands	River forests
Dendroica fusca											
Blackburnian warbler	S	C						Groves	x	x	x
Seiurus aurocapillus											
Ovenbird*	S	C						Thickets	x	x	x
Oporornis formosus											
Kentucky warbler	S	C						Woodlot undergrowth	x	x	x
Setophaga ruticilla											
American redstart*	S	C						Groves	x	x	x
Helmitheros vermivorus											
Worm-eating warbler	S	UC						Woodlot undergrowth	x	x	x
Certhia familiaris											
Brown creeper*	W	C						Groves	x	x	x
Regulus satrapa											
Golden-crowned kinglet	W	C						Thickets, groves	x	x	x
Regulus calendula											
Ruby-crowned kinglet	W	C						Thickets	x	x	x
Seiurus motacilla											
Louisiana waterthrush	S	UC	x	Streamsides		Wooded areas					
Riparia riparia											
Bank swallow	S	UC		x	x			Near water			
Quiscalus quiscula											
Common grackle*	Y	A		Streamsides			x	Croplands			

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Scientific and common names	Time of residence	Abundance	Habitat preference								
			Wetlands						Forests		
			Rivers	Streams	Marshes	Swamps	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Mimus polyglottos Mockingbird*	Y	C		x			x	Farms, roadsides			
Sayornis phoebe Eastern phoebe*	S	C		Streamsides			x	Farms, roadsides			
Icteria virens Yellow-breasted chat	S	FC		Stream tangles				Thickets			Willow thickets, moist canyons
Agelaius phoeniceus Red-winged blackbird*	Y	A				x	x		Hayfields, cultivated lands		
Melospiza melodia Song sparrow*	Y	A			x		Gardens	Roadsides thickets			
Pipilo erythrophthalmus Rufous-sided towhee, Spotted towhee*	Y	C					Suburbs, cities	Brush, undergrowth	Forest edges		
Empidonax virescens Acadian flycatcher	S	C							Open woods	Open woods	Wooded streams
Polioptila caerulea Blue-gray gnatcatcher	S	C							Open mixed woods	Oaks	River woods
Wilsonia citrina Hooded warbler	S	C							Woodland undergrowth	Woodland undergrowth	Woodland undergrowth
Troglodytes troglodytes Winter wren	W	UC							Woodland underbrush	Woodland underbrush	Woodland underbrush
Petrochelidon pyrrhonota Cliff swallow	S	LC	x					Farms open to semiwooded			
Protonotaria citrea Prothonotary warbler	S	C		x		Wooded areas					

Scientific and common names	Time of residence	Abundance	Habitat preference								
			Wetlands				Urban	Rural	Forests		
			Rivers	Streams	Marshes	Swamps			Seral pine-oak	Deciduous	Riparian
Progne subis Purple martin	S	LC					x	x			
Icterus spurius Orchard oriole	S	LC					x	Farms, orchard edges			
Thryomanes bewickii Bewick's wren	S	UC					Gardens	Thickets			
Dendroica pinus Pine warbler	S	C						Pine woodlots	x		
Pinicola enucleator Pine grosbeak	W	LC						Pine woodlots	x		
Spinus pinus Pine siskin	W	LC						Pine woodlots	x		
Spinis tristis American goldfinch*	Y	C						Orchards, roadsides			River groves
Molothrus ater Brown-headed cowbird*	S	C						Farms, fields, barnyards			River groves
Spizella arborea Tree sparrow	W	C						Woody fields, bushy areas			Willow thickets
Piranga olivacea Scarlet tanager	S	C								x	x
Corvus ossifragus Fish crow	Y	LC	x								
Sturnella magna Eastern meadowlark*	Y	C						Fields, meadows			
Spizella pusilla Field sparrow*	Y	C						Brushy semiopen fields			

Scientific and common names	Time of residence	Abundance	Habitat preference								
			Wetlands						Forests		
			Rivers	Streams	Marshes	Swamps	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Stelgidopteryx ruficollis Rough-winged swallow	S	FC		x				Roadsides			
Melospiza georgiana Swamp sparrow	W	C			x	Sedgy areas					
Hirundo rustica Barn swallow*	S	C			x			Farms, fields			
Cistothorus platensis Short-billed marsh wren	S	R			Grassy areas			Sedgy meadows			
Lanius excubitor Northern shrike	W	R				x		Orchards			
Acanthis flammea Common redpoll	W	IR				x		Fields			
Empidonax traillii Traill's flycatcher	S	C				x					Willow thickets, canyons
Euphagus carolinus Rusty blackbird	W	FC				Wooded areas					River groves
Sturnus vulgaris Starling*	Y	A					x	Farms, open groves, fields			
Passer domesticus House sparrow, English sparrow*	Y	A					x	x			
Eremophila alpestris Horned lark	Y	C					Airports, golf courses	Fields			
Thryothorus ludovicianus Carolina wren	Y	C					x	Woodlot thickets			
Pyrrhuloxia cardinalis Cardinal*	Y	C					x	Woodland edges, thickets			

Scientific and common names	Time of residence	Abundance	Habitat preference								
			Wetlands						Forests		
			Rivers	Streams	Marshes	Swamps	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Junco hyemalis Slate-colored junco[a]	W	A						Brush, roadsides			
Hesperiphona vespertina Evening grosbeak	W	LA						x			
Passerculus sandwichensis Savannah sparrow	W	C						Fields, meadows			
Pooecetes gramineus Vesper sparrow	W	FC						Hayfields, grainfields, roadsides			
Calcarius lapponicus Lapland longspur	W	UC						Fields			

[a] Perching birds that occur only in habitats not found at the Limerick site or along transmission line rights-of-way are not included.

[b] Sources:

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Scientific and common names	Time of residence	Abundance	Habitat preference								
			Wetlands						Forests		
			Rivers	Streams	Marshes	Swamps	Urban	Rural	Seral pine-oak	Deciduous	Riparian
Lanius ludovicianus Loggerhead shrike	Y	UC						Open country with lookout posts			
Tyrannus tyrannus Eastern kingbird*	S	C						Farmlands, orchards, roadsides			
Dumetella carolinensis Catbird*	S	C						Undergrowth, brush			
Toxostoma rufum Brown thrasher*	S	C						Brushy areas			
Vireo griseus White-eyed vireo	S	C						Thickets, dense shrubs			
Dendroica pensylvanica Chestnut-sided warbler	S	C						Brush, open second growth			
Dendroica discolor Prairie warbler	S	C						Semiopen brush			
Passerina cyanea Indigo bunting	S	C						Brushy places			
Ammodramus savannarum Grasshopper sparrow	S	C						Hay meadows, grasslands			
Sialia sialis Eastern bluebird*	S	FC						Farmlands			
Guiraca caerulea Blue grosbeak	S	FC						Brushy places, roadsides, thickets			
Ammospiza henslowii Henslow's sparrow	S	R						Weedy fields			

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4. An Aquatic Biological Study of the Valley Creek Watershed Streams prepared by the Conestoga High School biology class under the direction of Dr. Heister, Jr. (Assistant Director of the Green Valleys Association).

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10. Letters from the following organizations:

    a. Pennsylvania Game Commission
    b. Audubon Naturalist Society
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    e. Academy of Natural Sciences of Philadelphia

11. Final EIS - "Limerick Generating Station" prepared by U.S. Atomic Energy Commission, NOvember 1973.

APPENDIX 4

DESIGNATED HISTORIC AND ARCHEOLOGICAL SITES

DESIGNATED HISTORIC AND ARCHEOLOGIC SITES

Item No.	Name	Date
Charlestown Township		
C1	Charlestown Village House	1750
C2	Charlestown Village	--
C3	Old Charlestown Burial Grounds	--
C4	Rebecca Bones House	1810
C5	DeVault Village	--
C6	Aldham Village	--
East Pikeland Township		
EP1	Kimberton Country House	1796
EP2	Kimberton Village	--
EP3	Zion Evangelical Lutheran Church	
EP4	Rapps Covered Bridge	1866
EP5	? Inn	
Easttown Township		
E1	Waynesborough	1742
E2	Wayne School	--
E3	Sign of the Leopard Tavern	1726
E4	Leopard School	1856
E5	Colonial Burying Ground	--
E6	Lee Quarters	
E7	Ogden School	
E8	Waterloo Mills	
E9	Springhouse Tavern	
E10	Sign of the Fox Tavern	1784
E11	Stage Tavern	1812
E12	First Glassley School	1850
E13	Second Glassley School	
E14	? Inn	
East Vincent Township		
EV1	Scheeder Hall Covered Bridge	1850
EV2	Kennedy Covered Bridge	1856
EV3 ?	Inn	--
EV4	Revolutionary Soldiers Cemetery	--
EV5	Seven Stars Village	--
EV6	Heistand Village	--

Item No.	Name	Date
T20	DeAddio Cabin	
T21	Salem M.E. Church	
T22	Mennonite Meeting House	
T23	Diamond Rock School	1818
T24	Margaret Shumway David Cabin	
T25	Wilson Spring House	18th Cen.
T26	Great Valley Mills	1702
T27	Valley Prebyterian Church	1714
T28	First Presbyterian School	
T29	Howellville School	
T30	Howellville Village	
T31	Paoli Inn	
T32	General Jackson Inn	
T33	Blue Ball Tavern	1735
T34	Blue Ball Tavern	1790
T35	Mt. Airy School	1852
T36	Heyburn - Clark - Raye Cabin	
T37	Wetherby - Hampton - Snyder - Atlee Wilson Cabin	
T38	VanLeer - Curwin Cabin	
T39	Neilly Cabin	1770
T40	Peggy's Corner	
T41	T.E.H.S.	
T42	Drove Tavern	
T43	John Reese House	1797
T44	Mrs. Edward Browning Cabin	
T45	Great Valley Church	1711
	Great Valley School	1770
T46	Scott Quarters	
T47	Fairview School	1871
T48	Valley Meeting House	
T49	Sullivan Quarters	
T50	Mifflin Quarters	
T51	DeKalb Quarters	
T52	Weedon Quarters	
T53	Hammer Hollow Mill	
West Pikeland Township		
WP1	Chester Springs Village	--
WP2	Rapps Corner	--
WP3	Opporman's Corner	--
WP4	Chester Springs Bath House	1840
WP5	Chester Springs Hotel	Early 1800's
WP6	Chester Springs Summer House	--
WP7	Hoope's House	1740

Item No.	Name	Date
East Whiteland Township		
EW1	Hopper Ivy House	1780
EW2	St. Peter Protestant Episcopal Church	1744
EW3	Gunkle Spring Mill	1793
EW4	? Inn	---
EW5	Looch Aerie	1865
EW6	Zook Barn	1700's
Malvern Borough		
M1	Admiral Warren Tavern	1745
M2	Paoli Memorial Grounds	--
Schuylkill Township		
S1	Valley Forge Historic District	--
S2	Von Steuben's Quarters	--
S3	McIntosh Quarters	--
S4	Bull Tavern	--
S5	? Inn	--
S6	? Inn	--
S7	Corner Store	--
S8	Moore Hall	1750
Tredyffrin Township		
T1	Valley Forge State Park	--
T2	Valley Forge Site	--
T3	Stirling's Quarters	
T4	Knox's Quarters	
T5	Maxwell's Quarters	
T6	Layfayette's Quarters	
T7	Knox Bridge	1865
T8	DuPortail's Quarters	
T9	Wayne's Quarters	
T10	Pulaski's Quarters	
T11	Poor's Quarters	
T12	Potter's Quarters	
T13	Greene's Quarters	1705
T14	Howe's Quarters	
T15	Knyphausen & Woodford's Quarters	
T16	Cornwallis' Quarters	
T17	Lee and Bradford's Quarters	
T18	Capt. John David Home	
T19	Grist & Saw Mill	

Item No	Name	Date
West Vincent Township		
WV1	Birchrunville Village	--
Willistown Township		
W1	Greentree Inn	--
W2	Episcopal Church	--
W3	Sugartown Village	--
W4	Whitehorse Village	--
W5	Plumstock	1720
W6	Bartram Bridge	1860
W7	Thomas Mill	1774
W8	Vodges House	1795
W9	? Inn	

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APPENDIX 4A

Existing Municipality Environmental Controls

a. Charlestown Township

Within its comprehensive plan, areas of steeply sloping land, underlying geology, public parks, historical areas, and forests and woodlands have been identified and mapped in quantifiable form. Surface waters and floodplains, as environmentally sensitive points, have been noted on maps but not in a concise, quantifiable format. Soil characteristics and types have been discussed in the text with respect to agricultural suitability and the effect on this underlying groundwater. The quantity and quality of the groundwater within the township are also discussed within the text.

Surface waters have been located on both the existing land use inventory and the future land use plan as well as the public parks and historical areas. Agricultural land, and forests and woodlands have also been denoted on the existing land use inventory.

The following sections of the zon[illegible] subdivision ordinances specifically address themselves t[illegible]otection of the environmentally sensitive areas listed abov[illegible]

Charlestown Township Zoning Ordinance of 1950 as Amende[illegible]

1. Article IV. Farm Residential Districts, provides for the contin[illegible]tion of low density uses and protects them from degradation by noncompatible uses.

2. Section 900, Objectives of Cluster Development, permits a flexible arrangement of buildings so that the land can be utilized more efficiently.

3. Section 901.C.2 provides that all cluster development open space parcels be at least 5 acres and may be reserved for parks, woodlands, golf courses, playgrounds or other similar open space uses.

4. Section 901.D provides that open space areas of cluster development may be owned by property owner's association or dedicated to the township.

Charlestown Township Subdivision and Land Development Ordinance of 1970

1. Section 707(a) - Floodplains may not be developed unless adequate and proper provision is made for a healthful disposal of sewage and drainage of surface and subsurface water.

2. Section 710(b) - Shade trees of 6 inches or more in caliper shall be preserved whenever practical and replacement of each tree one foot or more in diameter by a tree not less than 2 inches in caliper may be required.

3. Section 711 - Recreation areas shall be provided to preserve natural features, trees, wooded areas, waterways, as well as scenic and historic structures and places.

4. Section 713 - Encouragement of cluster development as an instrument of environmental protection.

As can be seen from these lists, some degree of protection for these environmentally sensitive areas is now available. One recommendation by the comprehensive plan is that a board of historical architectural review be formed to protect historical areas.

b. East Pikeland Township

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Areas of steeply sloping land, underlying geology, public parks and historical areas, and forests and woodlands have been identified and mapped in quantifiable form in the township's comprehensive plan. Surface waters and floodplains, as environmentally sensitive points, have been noted on maps but not in a concise, quantifiable format. Soil characteristics and types have been discussed in the text with respect to agricultural suitability and effect on the underlying groundwater. The quantity and quality of the groundwater within the township are also discussed within the text.

Surface waters, agricultural land, public parks and historical areas have been located on both the existing land use inventory and the future land use plan. Floodplains have been presented on the future land use plan. Forests and woodlands have been outlined on the existing land use inventory.

The following sections of the zoning and subdivision ordinances specifically address themselves to the protection of the environmentally sensitive areas listed above.

East Pikeland Township Zoning Ordinances of 1969

1. Article 4 provides for the continuation of low density uses and protects them from degradation by noncompatible uses.

2. Section 600 - The Kimberton Retail District is established to provide the preservation of historic buildings in an existing retail area.

3. Section 1311 - Development may not occur within 50 feet of a stream or on any areas known to flood.

4. Section 1312.E.4 - Provisions for storm water drainage must be provided with any multi-family development.

5. Section 1312.E.7.a -All dwelling units of a multi-family development shall be served with public sanitary sewerage facilities and water supply approved by the public health office in that jurisdiction.

East Pikeland Township Subdivision Regulations

1. Section 302.F - Open spaces will be provided to preserve natural features such as large trees, woods, waterways, scenic points and historic spots and to reflect the comprehensive plan.

2. Section 303.E - Storm drains will be provided in developments to accommodate run-off.

3. Section 400 - Floodplains will not be subdivided for residential purposes or for the erection therein of any institutional, commercial or industrial building.

4. Section 402 - Existing trees will be protected where possible to maintain the natural vegetation, prevent erosion of topsoil, foster the retention of groundwater supply, and generally promote the health, safety and welfare of the citizens.

c. East Whiteland Township

Areas of steeply sloping topography underlying geology, soil types, agricultural land, public parks and historical areas have been identified and mapped in quantifiable form in the township's comprehensive plan. Surface waters, as environmentally sensitive points, have been noted on maps but not in a concise, quantifiable format. The quantity and quality of the groundwater are discussed within the text.

Surface waters, public parks and historical areas have been located on both the existing land use inventory and the future land use plan. Floodplains have been indicated on the future land use plan. Forests and woodlands have not been discussed or mapped to any significant degree.

The following sections of the zoning and subdivision ordinances specifically address themselves to the protection of the environmentally sensitive areas listed above.

East Whiteland Township Zoning Ordinances of 1966

1. Section 107.A promotes the most beneficial relationship between agricultural, residential, commercial, industrial and other uses.

2. Section 107.F aids in providing a guide for public policy and action concerning proper sanitary sewage disposal.

3. Article IV establishes Flood Hazard Districts to offer protection against increased flood heights or velocities of water; protect the quality and quantity of surface and subsurface water supplies adjacent to and underlying flood hazard areas; provide areas for the deposition of flood-borne sediment; and require that uses vulnerable to floods, including public facilities, be constructed so as to be protected against flood damage.

East Whiteland Township Land Subdivision Ordinance

1. Section 402.1 - Floodplains shall not be subdivided for any uses that may involve danger to the health, safety and general welfare of the citizens unless adequate permanent drainage is provided.

2. Section 501.2 - Land subject to fire, floods, disease or other dangers shall not be subdivided for building purposes unless the plans show adequate safeguards against them.

3. Section 502.7 - Storm water runoff from developments will be adequately provided for.

4. Section 508.7 - Subdividers shall preserve trees more than 6 inches in diameter at the base of the trunk, groves, waterways, scenic points, historic spots and other community assets and landmarks.

d. Tredyffrin Township

Areas of steeply sloping land, public parks and historical areas have been indentified and mapped in quantifiable form in the township's comprehensive plan. Surface waters, underlying geology, soil characteristics, quality and quantity of groundwater, and agricultural land have been discussed in the text.

Public parks and historical areas have been located on both the existing land use inventory and the future land use plan. Surface waters and floodplains have been indicated on the future land use plan. Forests and woodlands have not been discussed or mapped to any significant degree.

The following sections of the zoning and subdivision ordinances specifically address themselves to the protection of the environmentally sensitive areas listed above.

Tredyffrin Township Zoning Ordinance

1. Section 400 - Rural - Conservation Districts are designed to encourage the preservation of sizeable hilly, stream valley and wooded areas of the township for conservation, recreation, and other open space and historic purposes. The district regulations contain a density standard which facilitates the conservation and proper utilization of groundwater supplies and the control of soil erosion and surface-water flooding.

2. Section 1606 sets performance standards and prohibited uses to control air and water pollution from development.

3. Section 1608 establishes a special provision for planned residential development to relate development and open space preservation to environmental considerations.

4. Section 1608.6 - Any areas to be set aside or reserved for parks, woodlands, conservation, playgrounds or other open space purposes, such as the preservation of natural features or historical areas, shall be suitable for the designated purpose, be not less than 6 acres in size, be consistent with the plan and policy for future land use for the township and contain no structure other than one related to outdoor recreational use.

5. Section 1616 - Development is restricted in any area located within 50 feet of a stream, lake or similar body of water or in any other location subject to periodic flooding or designated on the zoning map as a floodplain area.

6. Section 2003.3 - Unified development area must take into consideration the ecology of the area (preservation of streams and lakes, protection against soil erosion and water contamination). At least 25% of the land must be reserved for open space. The location of land uses in the plans must take into account suitability with respect to topography and drainage; probable impact on municipal services, utilities and facilities; compatibility with surrounding land use; relationship of location to existing or probable sources of danger or nuisance; and the preservation of significant natural features. The unified development area must also preserve historic sites and structures.

Tredyffrin Township Subdivision Ordinance of 1959

1. Section 557.1 - Open spaces provided for subdivisions will give due consideration to the preservation of natural features, including large trees, groves, waterways, scenic and historical points and other community assets.

2. Section 579.2 - The type of private sewage disposal system to be installed shall be determined on the basis of location, topography, available area, soil characteristics, permeability and groundwater elevation.

3. Section 579.3 - The disposal area to be provided shall be determined by the results of percolation tests, soil classification and depth of the water table which shall be determined according to the size of the lot.

4. Section 623.7 - A subdivision plan must show any portion of the land that is subject to overflow, inundation or flood hazard by storm water.

Environmentally sensitive areas are also presently being protected by the Board of Historical and Architectural Review currently in existence. In addition to the Unified Development and Rural-Conservation Districts contained in the zoning ordinance, the comprehensive plan also suggests formation of stream valley conservation and scenic road preservation areas.

e. Willistown Township

Floodplains, areas of steeply sloping land, underlying geology and agricultural lands have been identified and mapped in quantifiable form in the township's comprehensive plan. Surface waters, as environmentally sensitive points, have been noted on maps but not in a concise, quantifiable format. Soil types and characteristics and the quantity and quality of the ground water in the township have been discussed in the text.

Surface waters, agricultural land and public parks and historic areas have been located on both the existing land use inventory and the future land use plan. Forests and woodlands have not been discussed or mapped to any significant degree.

The following sections of the zoning subdivision ordinances specifically address themselves to the protection of the environmentally sensitive areas listed above.

Willistown Township Zoning Ordinance of 1947

1. Section 100 - Zoning policy is based on the comprehensive plan which itself is based on environmental factors such as the township's soil types, geology, topography and sources of water supply.

2. Section 400 - RU-Rural and RU-1 Rural Residence Districts are intended to facilitate agriculture, conservation, recreation and other open space purposes and to provide for a rational pattern of township growth.

3. Section 1014 - Scenic preservation will be accomplished by not locating buildings in areas which dominate hilltops or monopolize views of the rural countryside.

4. Section 1411 - Special requirements are delineated so that open spaces of a special nature may be preserved. These areas include woodlands, stream valleys, unusual topography or other natural features or which are appropriate for parks, recreation or some other open space purpose, including agriculture. The minimum size for these areas is 6 acres.

5. Section 1413 - No dwelling or other building or structure shall be constructed in an area known to be subject to flooding or within 100 feet of the high-water mark of a stream, lake or similar body of water. As of mid-June 1974, an amendment creating floodplain conservation districts was being considered for adoption.

6. Section 1416.1 - Slopes greater than 15% should be preserved in their natural state where feasible.

7. Section 1416.2 - In developments of more than five dwelling units, trees of desirable species with trunks greater than 18 inches in circumference shall be preserved where possible.

8. Section 1416.3 - Topsoil shall be preserved from burial and erosion during the course of development and shall be redistributed as cover in final landscaping.

9. Section 1416.4 - Streams shall be protected from silting.

10. Section 1416.5 - The Chester County Soil Conservation Service will review plans for development to assure that silting, erosion and gullying will be minimized and topsoil conserved.

Willistown Township Subdivision Control Ordinance

1. Section 702.a - No land shall be subdivided for residential purposes unless all hazards to life, health or property from flood, fire and disease shall have been eliminated or unless the plans

for the subdivision shall provide adequate safeguards against such hazards.

2. Section 704.r - Provision of storm sewerage inlets, catch basins and manholes shall meet the requirements and the approval of the subdivision officer with regard to design and location.
3. Section 706.a - Recreation areas shall be reasonably compact parcels, placed to serve all parts of the subdivision, accessible from a public street and not excessively irregular in terrain.
4. Section 706.b - Subdividers shall preserve trees, groves, waterways, scenic points, historic spots snd other community assets and landmarks.
5. Section 706.g - Where a subdivision is traversed by a stream or other similar watercourse, the granting of an easement in order to assure the continued flow of water may be required.

f. Easttown Township

Floodplains, areas of steeply sloping land, public parks and historical areas, and forests and woodlands have been identified and mapped in quantifiable form in the township's comprehensive plan. Surface waters have been noted on maps but not in a concise, quantifiable format. Soil types and characteristics as well as the quantity and quality of the ground water in the township have been discussed in the text.

Surface waters, public parks and historic areas have been located on both the existing land use inventory and the future land use plan. Floodplains have been indicated on the future land use plan. Agricultural land has not been discussed or mapped to any significant degree.

The following sections of the zoning and subdivision ordinances specifically address themselves to the protection of the environmentally sensitive areas listed above.

Easttown Township Zoning Ordinance of 1939 as Amended

1. Articles III and IV - Conservation Residence and AA Residence Districts are intended to facilitate agricultural, conservation, recreation, low density residential and other open space purposes in recognition of the wet shallow soils, minimum drainage of these areas and the need to protect stream valleys.
2. Section 1204.1 - The site shall be adequate and appropriate for the proposed use in terms of size, topography, surface-water drainage, sewage disposal and accessibility.

3. Ordinance No. 116 establishes flood hazard areas which restrict or prohibit uses dangerous to health, safety and general welfare in times of flood or could cause increased flood heights or velocities; protect the quality and quantity of surface and subsurface water supplies adjacent to and underlying flood hazard areas; provide areas for the deposition of flood-borne sediment; require that uses vulnerable to floods, including public facilities, be constructed so as to be protected against flood damage; and require that, where uses are permitted by grant or variance, notice be given to prospective purchasers or lesses that the land is designated as lying either totally or partially within the flood hazard area.

Easttown Township Subdivision and Land Development Ordinance - 1973

1. Section 510.4 - A conservation plan is required by this section for each subdivision. The purpose of this plan is to insure that natural features such as slopes, streams, flood hazard areas, trees and areas of possible erosion are protected to the greatest extent possible.

2. Section 601.2 - Land subject to hazards to life, health, or property, such as may arise from fire, floods, disease or other cause, shall not be subdivided for building purposes or developed unless the hazards have been eliminated or unless the plans show adequate safeguard against them.

12

3. Section 601.3 - No on-site sewage disposal facility shall be permitted to be installed unless applicable township, state and/or Chester County standards are fully satisfied.

4. Section 601.4 - No basement, celler or slab foundation shall be constructed in a flood hazard area.

5. Section 623.1 - The developer shall provide the highest type of sanitary sewage disposal facility consistent with existing physical, geographical and geological conditions and in conformance with all applicable township ordinances and state, county and federal regulations.

6. Section 625 - This section outlines the provisions that must be provided to accommodate storm drainage from proposed subdivisions. Special account is to be taken of existing natural watercourses, existing storm water runoff problems and anticipated runoff from property at higher elevations developed in the future.

7. Section 626.1 - The developer shall employ available measures for control of erosion and sedimentation and shall meet, as a minimum, the standards and specifications of the U.S.D.A. Soil Conservation Service as then adapted for use by the Chester County Soil and Water Conservation District.

8. Section 626.2 - In addition, the developer, as part of the conservation plan required under Section 510 of the ordinance, shall submit data, including proposed dates where relevant, to indicate that the subdivision or development will be carried out in compliance with the following principles:

    a. The smallest practicable area of land should be exposed at any one time during development or construction.

    b. When land is exposed during development or construction, the exposure should be limited to the shortest practicable period of time.

    c. Temporary ditches, dikes, vegetation and/or mulching should be used to protect critical areas exposed during development or construction.

    d. Sediment basins (debris basins, desilting basins or silt traps) should be installed and maintained to remove sediment from runoff waters from land undergoing development.

    e. Provisions should be made to accommodate effectively the increased runoff caused by changed soil and surface conditions during and after development or construction.

    f. Permanent vegetation and erosion control structures should be installed as soon as practicable during construction activities.

    . Wherever feasible, natural vegetation should be retained and protected, and natural grade alterations kept to a minimum.

9. Section 628 - Community assets. Consideration shall be shown for all natural features such as large trees, water courses, steep or wooded slopes, historic areas and structures and similar community assets which, if preserved, will add attractiveness and value to the remainder of the subdivision. Trees and ornamentals shall be preserved wherever possible.

    Whenever such natural features may be more effectively preserved by development of tracts in accordance with the "lot averaging" provisions otherwise applicable thereto, developers shall give full consideration to development in accordance with "lot averaging".

10. Section 705 - This section sets standards by which individual and groves of trees must be preserved.

Ordinance for the Regulation of the Disposal of Sanitary Sewage

Section 10.1 - Requirements include environmental factors which must be considered in the locations and types of individual sewage disposal systems for single family dwellings.

Proposed Ordinance for Erosion, Sedimentation and Grading Control

As of mid-June 1974, an erosion and sedimentation ordinance was being considered which would require a municipal permit for most grading and construction activities.

The proposed land use section of the Easttown Plan delineates the conservation and open spaces that should be set aside in the future. These include floodplains and unsuitable drained soils.

g. Schuylkill Township

Areas of steeply sloping land, underlying geology, public parks and historical areas, as well as forests and woodlands, have been identified and mapped in quantifiable form in the township's comprehensive plan. Surface waters and floodplains have been noted on maps but not in a concise, quantifiable format. Soil characteristics and types have been discussed in the text with respect to agricultural suitability and effect on the underlying ground water. The quantity and quality of the groundwater within the township are also discussed.

Surface waters and public parks and historical areas have been located on both the existing land use inventory and the future land use plan. Floodplains and forests and woodlands have been outlined on the future land use plan.

The following sections of the zoning and subdivision ordinances specifically address themselves to the protection of the environmentally sensitive areas listed above.

Schuylkill Township Zoning Ordinance of 1955

1. Section 702.a - Low-lying lands which are swampy or subject to periodic flooding shall not be planned for residential development or such other uses as may involve a danger to the life, health, safety or property of persons unless adequate and proper provision is made for a healthful disposal of sewage and drainage or surface and subsurface water.

2. Section 710.b - Shade trees of 6 inches or more in caliper shall be preserved whenever practical, and the subdivider may be required to plant one tree of not less than 2 inches in caliper for each tree of one foot in diameter or more to be destroyed.

3. Section 711 - Whenever, and to the extent deemed desirable, provision shall be made for suitable open spaces for parks, playgrounds and other recreational uses; and consideration shall be given to the preservation of natural features, including large trees, wooded areas, waterways and scenic and historical places and structures.

4. Section 712 - No topsoil stripped in the subdivision shall be disposed of but shall be replaced within the subdivision.

5. Section 802 - No land subject to periodic or continual flooding or land not capable of supporting on-site sewage disposal systems and unable to connect to an off-site sanitary sewage disposal system shall be subdivided for the purpose of constructing thereon any structures intended for human habitation.

It has been suggested in the comprehensive plan that a board of historical review be implemented. Floodplains and stream valleys are not specifically delineated on the official zoning map, and this step should be taken. 126

h. Malvern Borough

Malvern does not at this time have a comprehensive plan. It does have zoning and subdivision ordinances, and the following sections of the subdivision ordinance address themselves to the protection of the environmentally sensitive areas.

Malvern Borough Subdivision and Land Development Regulations of 1973

1. Section 402.b - A copy of each sketch plan, or preliminary plan if no sketch plan is submitted, will be submitted to the Chester County Health Department for a review of matters relating to requirements for public water and sewers and/or the adequacy of the site to sustain on-site water and sewage disposal systems.

2. Section 402.c - A copy of each sketch plan, or preliminary plan if no sketch plan is submitted, and final plan will be submitted to the Chester County Soil and Water Conservation District for a review of matters relating to drainage, storm water management, abatement of soil erosion and other relevant matters.

3. Section 604.e provides guidelines for storm sewers, culverts and related installations to accommodate natural watercourses and storm water runoff.

4. Section 608 outlines tree types and sizes that should be preserved during development and the provisions that should be made for public facilities.

5. Section 611 - The developer shall employ available measures for control of erosion and sedimentation and shall meet, as a minimum, the standards and specifications of the U. S. Department of Agriculture, Soil Conservation Service, as then adapted for use by the Chester County Soil and Water Conservation District. In addition, the developer will submit data to indicate that the subdivision or development will be carried out in compliance with additional requirements of the township as set forth in this section.

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APPENDIX 5

Alternatives

EXHIBIT 1

494 Hilltop Road
Paoli Penna 19301

October 4, 1973

Mr. Steven Torok
Environmental Protection Agency
Region 3 6th + Walnut Sts
Philadelphia, Pa 19106

Dear Mr. Torok.

As we discussed on the telephone, I believe the EPA should consider alternative methods of treating sewage for the Valley Creek collection system of the Valley Forge Authority, to avoid running the lines through the historic areas in or near Valley Forge Park. It would seem to me that it would be extremely difficult to install a large line in the "canyon" along route 252 in the park, particularly so as to avoid disturbing the many historical sites along the Valley Creek.

One alternative that should be examined is terminating the sewer lines near the intersection of mill Road and Valley Creek, building a *secondary* treatment plant there and using the 900+ (or a portion) acres downstream for spray irrigation of the effluent. As I am sure you are aware, this would contribute to the recharging of the acquifers in the area (including the Phila. Suburban Water Company's well at the Turnpike and Valley Forge Road) and would reduce the additional contamination of the Schuylkill River to zero from the 2-3 percent BOD remaining from the proposed Schuylkill River plant and the Chlorine required to neutralize the effluent.

Another alternative to the routing through the park would be to pump from the Mill Road collection point along Diamond Rock Road, over Valley Forge Mountain, then along Country Club Road, Ferry Lane to the treatment plant site. Undoubtedly there would be higher pumping capital and operating costs, but I believe, that on further examination these will be offset by one-half to a mile less pipe, high costs in the "canyon" area, and the environmental damage to the Park and Valley Creek.

I would be pleased to discuss
131 these thoughts with you further, if you wish.

Very Truly Yours,

Romney B. Biddulph

Telephone H. N14-6513
O 542-2661

W. HOWARD CORDDRY
JOHN R. DIETZ
CHARLES H. KRESSLER
SAMUEL I. ZACK
JAMES A. ROMANO
CECIL H. PEPPERMAN
MAURICE A. WADSWORTH
GEORGE BURCIN
H. BRUCE GERBER
WALTER K. MORRIS

PERRY C. SNYDER
ALBERT C. HOOKE
JAMES H. HERENDEEN
WILLIAM G. DRURY
J. DOUGLASS BERRY
CHARLES W. PICKERING

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
ENGINEERS

P. O. BOX 1963
HARRISBURG, PENNSYLVANIA 17105
PHONE: 717 238-0451

CABLE ADDRESS: GANFLEC

WILLIAM H. ALLEN
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HAROLD T. WADDINGTON
FRANK J. DONATELLI
JAMES R. MADARA
HERMAN R. STARTZENBACH
JOHN E. WATERS
PHILIP P. AMPOLLINI
GILBERT G. BRINCKERHOFF
JAMES L. LONG
ANTON F. MIORIN
RAY F. STAUFFER
F. JAMES KNIGHT
C. KENNETH MYERS
PAUL E. PAUL
GEORGE H. SMITH

October 30, 1973

Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

EXHIBIT 2

Attention: Environmental Impact Branch

Re: C-42-688
Tredyffrin Township Municipal Authority
Chester County, Pennsylvania

Gentlemen:

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As requested by Mr. Anthony J. Donatoni of your office, enclosed is information relative to the above subject project. This information, shown in Table 1 and on the enclosed drawings, compares estimated construction costs and power costs for three alternative force main routes from the relocated Wilson Road Pumping Station to the Valley Forge Sewer Authority Sewage Treatment Plant. The selected alternative for design purposes is Alternative A, which has both least construction costs and power costs.

We trust that the above information is satisfactory. Should you have any questions, please contact me.

Very truly yours,

GANNETT FLEMING CORDDRY AND CARPENTER, INC.

Howard P. Haines
HOWARD P. HAINES
Project Engineer
Pollution Control Division

HPH:rp
Enclosure
cc: Tredyffrin Township Municipal Authority

EXHIBIT 2

TABLE 1
COMPARISON OF COSTS FOR ALTERNATE LOCATIONS OF THE WILSON ROAD FORCE MAIN
TREDYFFRIN TOWNSHIP MUNICIPAL AUTHORITY
CHESTER COUNTY, PENNSYLVANIA

Alternate "A"

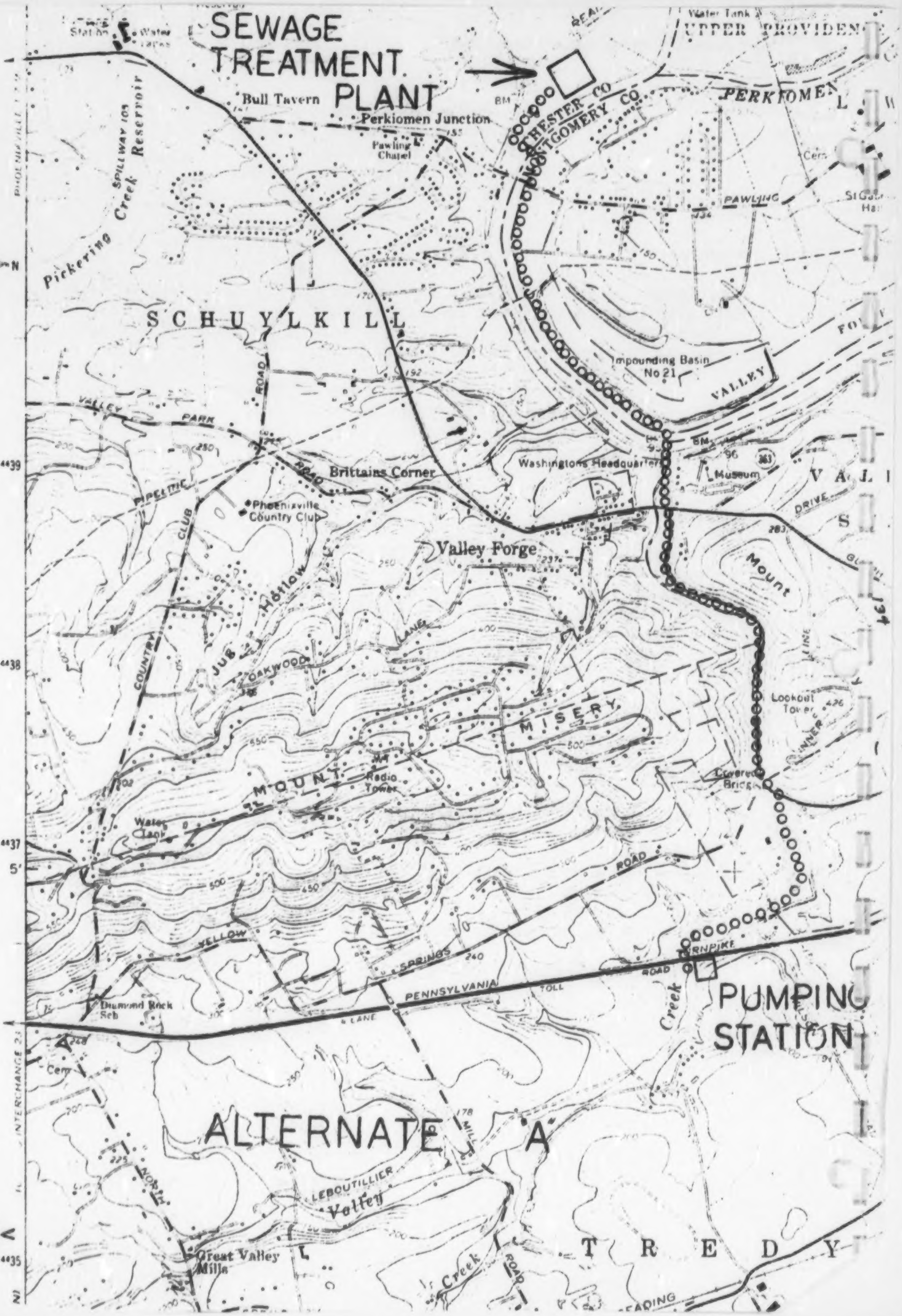
Approximate Length of Wilson Road Force Main	18,000 feet
Estimated Construction Cost of Wilson Road Force Main	$1,600,000
Estimated Construction Cost of Wilson Road Pumping Station	890,000
Total Estimated Construction Cost	$2,450,000
Estimated Power Costs	$75/Day

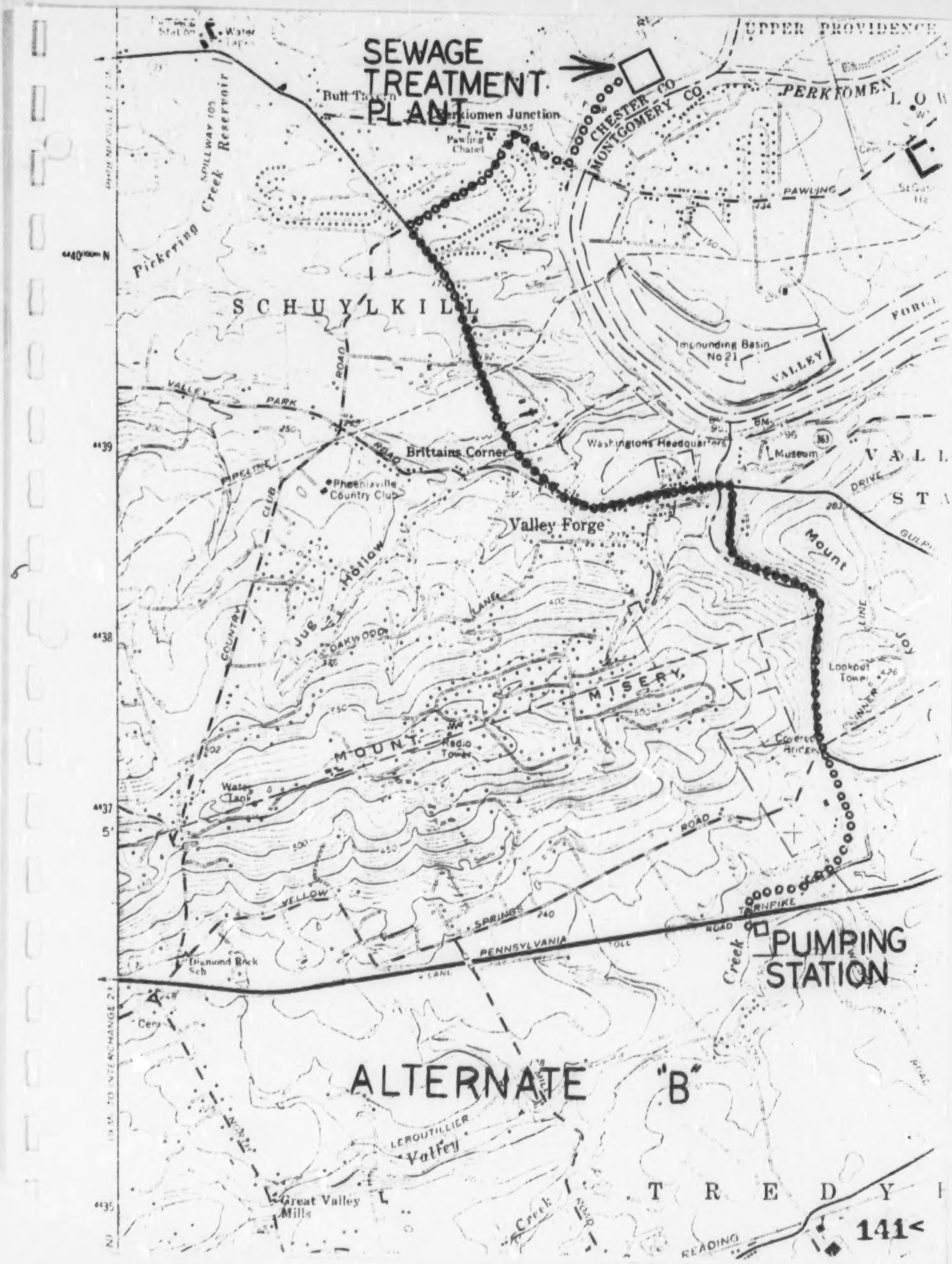
Alternate "B"

Approximate Length of Wilson Road Force Main	24,000 feet
Estimated Construction Cost of Wilson Road Force Main	$1,960,000
Estimated Construction Cost of Wilson Road Pumping Station	1,050,000
Total Estimated Construction Cost	$3,010,000
Estimated Power Costs	$153/Day

Alternate "C"

Approximate Length of Wilson Road Force Main	23,000 feet
Estimated Construction Cost of Wilson Road Force Main	$2,100,000
Estimated Construction Cost of Wilson Road Pumping Station	1,960,000
Total Estimated Construction Cost	$4,060,000
Estimated Power Costs	$286/Day


SEWAGE TREATMENT PLANT
PUMPING STATION
ALTERNATE A
Bull Tavern
Perkiomen Junction
Pawling Chapel
CHESTER CO
MONTGOMERY CO
UPPER PROVIDENCE
PERKIOMEN
PAWLING
Pickering Creek Reservoir
SPILLWAY 105
SCHUYLKILL
Impounding Basin No 21
VALLEY
VALLEY PARK ROAD
Brittains Corner
Phoenixville Country Club
Washingtons Headquarters
Museum
Valley Forge
Mount
Jug Hollow
OAKWOOD LANE
COUNTRY CLUB
MISERY
MOUNT
Radio Tower
Water Tank
Lookout Tower
Covered Bridge
YELLOW SPRINGS ROAD
PENNSYLVANIA TURNPIKE
Creek
Diamond Rock Sch
Cem
LEBOUTILLIER
Valley
Great Valley Mills
Creek
T R E D Y
READING
NORTH


SEWAGE TREATMENT PLANT
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ALTERNATE "B"
UPPER PROVIDENCE
PERKIOMEN
CHESTER CO
MONTGOMERY CO
Bull Tavern
Perkiomen Junction
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Brittains Corner
Washingtons Headquarters
Museum
Phoenixville Country Club
Valley Forge
Mount Joy
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OAKWOOD LANE
COUNTRY CLUB ROAD
PIPELINE
MISERY
MOUNT
Radio Tower
Water Tank
Lookout Tower
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YELLOW SPRINGS ROAD
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Creek
Diamond Rock Sch
LEROUTILLIER
Valley
Great Valley Mills
TREDY
READING
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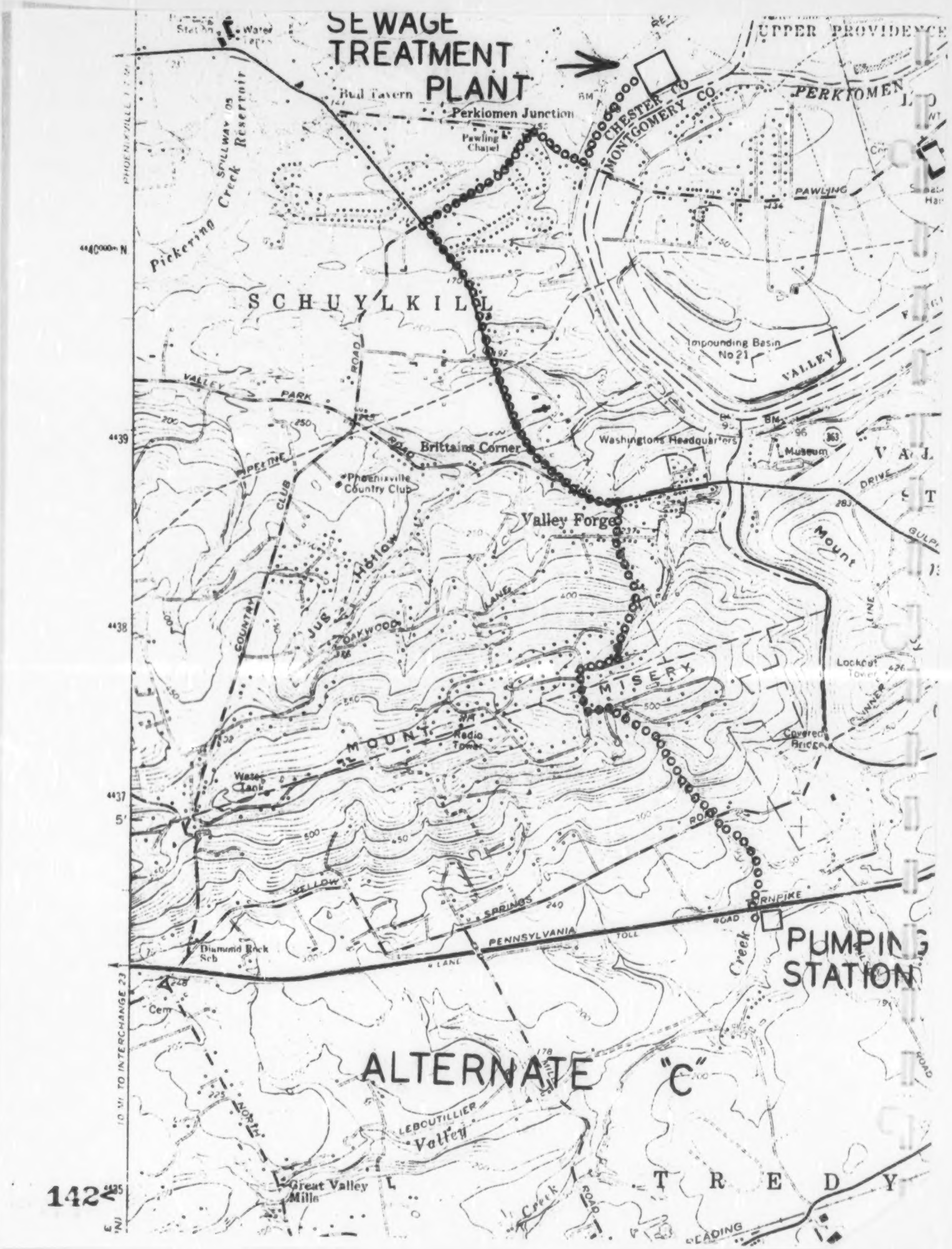
SEWAGE TREATMENT PLANT
PUMPING STATION
ALTERNATE "C"
UPPER PROVIDENCE
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Pickering Creek Reservoir
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CHESTER COUNTY CONSERVATION DISTRICT
14 East Biddle Street
WEST CHESTER, PENNSYLVANIA 19380

DIRECTORS
G. Pownall Jones, *Chairman*
George Frank, *Vice Chairman*
Monroe Nute
Frank McBerty
Mrs. Gertrude Yarnall
Russell B. Jones
Clement J. Sheppeck

Marshall Haws
Executive Conservationist

Phone: 215-696-5126

Robert G. Struble
Secretary - Treasurer

Phone: 215-696-0475

October 1, 1973

EXHIBIT 3

Anthony J. Donatoni
Environmental Protection Agency
6th & Walnut Sts.
Philadelphia, Pa. 19106

Dear Don

Enclosed is the information that you requested.

I did not go into the costs of acquiring land--since it seems so obvious tha me that the Park is so adequate and should be available at no cost--and as indicated--even paying for some of the nutrients, or the irrigation installation, etc.

37 If you have any other questions, or you would like to fill in any other details, please feel free to call or write.

You may want to check with John xxxxx O'Neal on xxxxxxxx his concepts.

I realize that some of the comments that I have made are contrary to some of the commonly accepted points put out by the regulatory authorities. However, I believe that I have more than adequate backing for my thinking. i.e., Bill Minneo, Dr. Kardos, common sense, etc.

I also feel that I have not done justice to a presentation of this xxxxxxx sort. There is so much more evidence (documentation)(references to people, meetings, comments, etc) that could be presented.

But time is short.

Again, if you have any further question, please feel free to call or write.

Have a good day,

Marshall

Marshall Haws

CHESTER COUNTY CONSERVATION DISTRICT
14 East Biddle Street
WEST CHESTER, PENNSYLVANIA 19380

DIRECTORS
G. Pownall Jones, *Chairman*
George Frank, *Vice Chairman*
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Robert G. Struble
Secretary - Treasurer

Phone: 215-696-0475

September 28, 1973

Anthony J. Donatoni, Engineer
Environmental Protection Agency
6th & Walnut Sts.
Philadelphia, Pa. 19106

EXHIBIT 3

Dear Mr. Donatoni

You asked two questions concerning the possibilities of recycling water and nutrients from the proposed Valley Forge Sewarage Treatment Plant as an alternative to dumping the nutrients into the Schuykill river, namely:

1) Is there at least 1,000 acres of suitable soils available within a few miles of the proposed plant for such recycling and water renovation?

2) and, What would be the cost of such land for such use?

In reply:

1) There are at least 2200 acres of excellent soils suited to the land disposal of the nutrients from the proposed Valley Forge treatment plant, located not over 3 miles away.

2) This land should not involve a cost factor since it is state land, it can use nutrients to good advantage, and the Park could even produce income to the sewer authority.

I am referring to the 2255 acres contained in the Valley Forge Park. There is over 600 acres in Chester County with the remainder in Montgomery County. It is my understanding that the Park is planning for thousands of visiters during the Bicentenial celebration. These visiters will put severe traffic on the sparse vegetative cover that now exists on the Park lands. The vegetative cover, in order to withstand this traffic should be given adequate nurishment so that it will build up the root and crown growth that will withstand the foot traffic. This revitalization of the grass cover will help keep the soil from eroding, recycle essential water supplies and renovate the waste water.

The main soil types on Valley Forge Park are Glenelg Channery silt loam, Hagerstown silt loam and Edgemont very stoney loam.

The Chester County Soil Survey says of the Glenelg soil, "... a sod cover of legumes and grasses should be grown 1 year out of 3. The sod will help control erosion, improve the structure of the soil and add organic matter. ..." pg. 79--Soil Survey.

For the Hagerstown silt loam, the Survey says, "...Large amounts of plant nutrients are required every few years to help maintain grasses and legumes. ..." "...A cover of sod is needed in the natural drainage ways ..." "...The soil is well suited to most of the general farm crops and truck crops grown in the area. ... Disking the corn stubble into the soil in the fall and growing legumes and grasses 25% to 50% of the time help to maintain the content of the organic matter and also help to prevent erosion. ..." pg. 83, Soil Survey.

In the case of each and every soil, the addition of nutrients and organic matter provides a more hardy growth of vegetation.

Rather than have Park maintaince use purchased plant nutrients in the form of rock phosphate, potash, and nitrate formulations, it would be much better to utilize the nutrients available from the proposed Valley Forge treatment plant. These water soluable nutrients combined with as much of the organic material possible from the treatment plant would be highly beneficial.

Robert Powers, Chester County Extension Agent estimates that Chester County soils contain 1.5% organic material. Ideally, they should contain 5% organic material. There is no reason why the difference in required organic material could not be made up in part from the organic material from the treatment plant.

The book, GREEN LAND, CLEAN STREAMS (Temple University) makes several pertinent comments, e.g., "...the Penn State rule of 129 acres for 1 mgd is almost a maximum rather than a mean upon which any calculations of acreage must be based. ...'

The book goes on to say, "Another source of land ... is public parks, game lands, and other public open land". The book suggests Fairmount Park in Philadelphia as an example of such land. "An incalculable number of acres are owned, cultivated, and maintained along this country's superhighways. ..." This would indicate that the land along the Penna. Turnpike in this area would make a suitable recycling site.

The book continues, "...privately owned land is available at little or no cost to land treatment. Waste water usually contains nutrients which have a real dollar value when compared to commercial fertilizer." This fertility value applies whether the nutrients are applied to Valley Forge Park, to other public lands, or to private lands.

Benjamin Reynolds, Avondale, Chester Co., in his work with irrigation of animal nutrients (and there is no difference in the nitrates, phosphorus, potassium, and trace minerals in animal wastes and human wastes) has indicated that weekly applications of nutrients in water solution has enhanced the growth of agricultural crops over the growth produced by the application of commercial fertilizers at planting time. This would also apply to any of the suggested areas.

It would seem justifiable for the state owned park land to pay some token fee for the nutrients that it uses beneficially. This could be setting a precedent which could be used in the sale of nutrients from other treatment facilities as they change to the "living filter" system of renovation.

If the proposed Valley Forge plant were sited at the Perkiomen Junction area, there is considerable acreage in the vicinity that would be satisfactory for land renovation. The soils are Penn silt loam, Bucks silt loam, Rowland silt loam, man-made soils and others in lesser amounts. These soils would require a bit more agricultural management than the soils on Valley Forge Park; but would be quite satisfactory if only disposal of the nutrients is considered. Again, for best reuse of the nutrients, the Park area would be preferred.

The Soil Survey map shows considerable agricultural acreage across the Schuykill from the Perkiomen Junction that should be fully as suitable as the soils in the Junction area. Without a doubt, this land could be leased for disposal or renovation.

Within a five mile radius of the Perkiomen Junction, there are quite a large number of areas of suitable soils in Charlestown, Schuykill, and East Whiteland townships. It would be merely a matter of obtaining irrigation easements--perhaps being able to recover some amount for the nutrients provided. And this covers only the Chester Co. side of the Schuykill, there seems to be similar acreage on the Montgomery side.

Now that the need for the recycling of nutrients and water is being given its proper recognition, it should be hoped that the bureaucratic agencies would recognize the basic American principle of making each landowner responsible for his own effluent disposal. Each developer should provide waste stabilization ponds for necessary treatment and recycling of effluents on his own property. Or if not on his 140
own property, then he should make the necessary arrangements with neighboring landowners to make feasible facilities both for his present development and for future development in the contiguous area. Water supplied from the immediate area, i.e., watershed area, should be recycled in the area, not flushed from the treatment facility into the streams and on into the oceans.

To show how sub-divisions might take care of their own effluent, Chesterbrook in Tredyffrin Township might be used as an example. A certain amount of this sub-division is to remain inopen space. The less well drained soils could be used for waste stabilization pond sites. The effluent from these ponds would be irrigated over the open areas, and areas where lush vegetative growth was desired. Nutrients would be removed by the "living filter". The renovated water would be recycled to the underground water supply either to feed out to the streams or to recharge the underground water supply if it had been drawn down during a draught season.

This sub-division would not require the enlargement of future sewage treatment facilities off-site. There would be no additional cost to the township and the taxpayer to provide masonery monuments for nutrient disposal that could be handled more satisfactorily by the "living filter".

There are a number of golf courses and country clubs in the area that could benefically use the nutrients from sewage treatment plants. It might be that it would be better to hold these areas open for smaller, local package plants that are now discharging to local streams.

In summary:

1) Any soil with a mixture of loam, and clay material, a minimum of 3 feet to bed rock or water table--is suitable for the renovation of waste water. (Isodore Minneo, Wisihicken Watershed Association)

2) It is not necessary for the Valley Forge Sewer Authority to purchase the land required for nutrient removal and renovation of its effluent.

3) It is morally wrong to dump nutrients into any stream.

4) The Valley Forge Park area is an excellent area for land renovation and could make excellent use of the available nutrients and organic material.

5) The deeper the soils, the less good agricultural management is needed to handle the renovation process properly.

14. 6) While private land owners might be reluctant to pay for available nutrients and organic material in the effluent stream, until the value is proven to them, the State Park lands could draw on the expertise of the Penn State investigators to establish a precedent for the payment of a token fee for the nutrients received.

7) The use of waste stabilization ponds and land irrigation would put the responsibility of sewage treatment and renovation back on the property owner--releasing local and federal funds, taxpayers dollars, for more productive use.

There are many other facets on the benefits of using land renovation and the Valley Forge Park area for this purpose. If you care for further comments, please call or write.

Sincerely yours,

Marshall

Marshall Haws

NATURAL LANDS TRUST, INCORPORATED
FOUR MILLS NATURE RESERVE • MORRIS RD., AMBLER, PA. 19002 • MI 6-0267

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ALLSTON JENKINS
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Administrative Naturalists
ROBERT L. GARNER
BARBARA M. GARNER

Trustee
GIRARD BANK

May 16, 1974

Exhibit 4

Mr. Anthony Donatoni
Environmental Impact Branch
EPA Region III
Curtis Building
6th and Walnut St.
Philadelphia, Pa. 19106

Dear Mr. Donatoni:

As per your phone request on May 10, 1974, this letter is to inform you of a meeting I had with Mr. Walter Giersch and Mr. Robert Blue of Yerkes Associates, Inc. on April 11, 1974, at the Sharp's Woods Nature Reserve, Leopard Rd. and Byrd Drive, Berwyn, Pa. Construction of the sewer line was discussed and a satisfactory verbal agreement was reached for the route of the sewer line through the Reserve.

As now proposed the route from east (starting at Leopard Rd.) to west is as follows: Manholes 7,8, and 9 will remain as shown on the original plan for the Daylesford Area (Leopard Rd., sheet 17 of 62, Yerkes Associates, Inc., Feb. 28, 1973). There will be no connecting line from Argyle Rd. (manhole 84) to manhole 8. Yerkes Associates, Inc. agreed to reroute this section in a letter to us dated March 18, 1974. Manholes 10 through 14 have been relocated to follow an abandoned roadway near the northwest boundary of our property. Connecting lines from Byrd Drive (manhole 76) and a cul-de-sac on Hawthorne Place will tie into the main line through the Reserve.

This route has been selected in order to minimize damage to large trees on the property.

Sincerely yours,

Barbara M. Garner

Barbara M. Garner

cc: Mr. Allston Jenkins
Mr. William R. Traub, Esq.

Board of Directors
William F. Blackman
George R. Clark
William L. Elkins
Maurice Heckscher
Allston Jenkins
~~Hugh McB. Johnston, III~~
Julius Rosenwald, II
Harold D. Saylor
I. Tatnall Starr, II
Paul Thompson, II
William R. Traub
John G. Williams

APPENDIX 6

Description of Proposed Action

YERKES Associates inc.
101 CHARLES DRIVE • BRYN MAWR • PA. 19010 • • (215) LA 5-6200

Received
AUG 28 1970
BUCHART-HORN
YORK
PA

August 26, 1970

EXHIBIT 1

Mr. Douglas McGill
Buchart-Horn Inc.
Box 1823
40 South Richland Avenue
York, Pennsylvania 17405

Re: Valley Forge Sewer Authority

Dear Doug:

I am enclosing three copies of a sketch of the geodetic map showing the approximate areas in Easttown to be sewered.

I have read Articles V and VI of the proposed agreement and find them to be satisfactory from our viewpoint.

143 Our total capacity reserved in the trunk line is 1 m.g.d. This, I think, will be equivalent to our requirements in the year 2010. The initial sewage flow (1974 - 1975) would be estimated at about .56 m.g.d. Our total estimated flow in 1985 we would estimate to be .9 m.g.d.

Please note that the increase from .56 m.g.d. to .9 m.g.d. will probably be in one step as the large area noted to be sewered in the future is connected. The area being presently sewered is almost totally developed, and the sewerage flows will not increase greatly unless high density residential uses are permitted (they are not now). We would estimate the increase in flow to .9 m.g.d. to occur before 1985. Because of the above, the graph requested is not included as it would not apply.

Please let me know if you need any further information.

Very truly yours,

YERKES ASSOCIATES, INC.

John B. Yerkes

John B. Yerkes, Jr.

JBY jr/jb
Enclosures
ccs: Rogers, Gentry, Windle, Lamb, Ms. Sue Windle
Easttown Municipal Authority, Mr. Harper
Easttown Township, Mr. A. Taylor, Mr. Stefano

ROY F. WESTON

ENVIRONMENTAL SCIENTISTS AND ENGINEERS
LEWIS LANE • WEST CHESTER • PENNSYLVANIA

REPLY TO:
LEWIS LANE
WEST CHESTER
PENNSYLVANIA 19380
215-692-3030

24 August 1970

EXHIBIT 1

AUG 25 1970
BUCHART-HORN
YORK
PA

Mr. Douglas L. McGill, P.E.
Chief Sanitary and Hydraulic Engineer
Buchart-Horn
40 South Richland Avenue
York, Pennsylvania 17405

Re: Valley Forge Sewer Authority - Joint Concept
Letter Dated 6 August 1970

Dear Doug:

The proposed revisions to Sections V and VI of the Valley Forge Sewer Authority's Joint Municipal Agreement are currently being reviewed.

The reserve capacities for Willistown, Malvern, and East Whiteland for design year of 1988 are 1.00 MGD, 0.53 MGD, and 1.60 MGD, respectively.

Enclosed you will find flow projections and marked up U.S.G.S. maps for each of the aforementioned municipalities.

Very truly yours,

Bill

William R. Lohmann
Project Engineer/Project Manager

WRL:mc

Enclosures

cc: Mr. John Lukens, Secretary
Willistown Township

Dr. Richard Keyser, Secretary
Malvern Municipal Authority

Mr. John R. Haines, Chairman
East Whiteland Township Municipal Authority

R. P. Relyea

R. A. Nagy

ROY F. WESTON

W.O. 199-98
PAOLI AREA
SEWERAGE SYSTEM

ESTIMATED
POPULATION, EQUIVALENT DWELLING UNITS, AND SEWAGE FLOWS
FOR
MALVERN BOROUGH, EAST WHITELAND TOWNSHIP AND WILLISTOWN TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA
JANUARY 1970
(BY MUNICIPALITY)

Municipality	Item	YEAR 1973	1983	1990	2010
Malvern Borough	Sewered Population	3,080	3,620	3,900	6,200
	EDU	770	900	980	1,500
	Average Flow (MGD)	0.38	0.48 (3) (154)	0.55	1.00
	Peak Flow (MGD)	0.95	1.20	1.38	2.50
Willistown Township	Sewered Population	[illegible],400	7,500	7,700	8,000
	EDU	2,060	2,270	2,300	2,360
	Average Flow (MGD)	0.85	1.03 (2) (137)	1.10	1.31
	Peak Flow (MGD)	2.13	2.58	2.75	3.28
East Whiteland Township	Sewered Population	4,200	7,400	13,900	19,000
	EDU	1,200	2,210	4,340	6,400
	Average Flow (MGD)	0.50	1.00	2.08	3.60
	Peak Flow (MGD)	1.25	2.50	5.20	9.00

146

SUMMARY

	YEAR 1973	1983	1990	2010
Total Average Flow	1.73	2.51	3.73	5.91
Total EDU	4,030	5,380	7,620	10,260

26 January 1970

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
ENGINEERS

W. HOWARD CORDDRY
J. DONALD CARPENTER
JOHN R. DIETZ
CHARLES H. KESSLER
SAMUEL I. ZACK
JAMES A. ROMANO
FRANK J. WILLIAMS
GEORGE BURCIN

PERRY C. SNYDER
CECIL H. PEPPERMAN
ALBERT C. MOORE
H. BRUCE GERBER
JAMES H. HERENDEEN
FRANK H. WILLIAMSON
WILLIAM G. DRURY
J. DOUGLASS BERRY

P. O. BOX 1963
HARRISBURG, PENNSYLVANIA 17105
PHONE: 717 238 0451
CABLE ADDRESS: GANFLEC

CHARLES W. PICKERING
LEWIS A. GARBACIK
WILLIAM H. ALLEN
JOSEPH W. LIPSCOMB
WALTER E. MORRIS
MARCELLO H. SOTO
HAROLD T. WADDINGTON
MAURICE A. WADSWORTH
FRANK J. DONATELLI
JAMES R. MADARA
HERMAN R. STARTZENBACH
JOHN E. WATERS
PHILIP P. AMPOLLINI
GILBERT G. BRINCKERHOFF
JAMES L. LONG
ANTON F. MIORIN
RAY F. STAUFFER

RECEIVED
OCT 7 1970
BUCHART-HORN
YORK
PA.

October 5, 1970

EXHIBIT 1

Mr. Douglas L. McGill
Buchart-Horn
40 South Richland Avenue
York, Pennsylvania 17405

Dear Mr. McGill:

Re: Valley Forge Sewer Authority
Joint Treatment of Sewage
from Tredyffrin Township

146

In accordance with your request and as authorized by Tredyffrin Township Municipal Authority, we transmit herewith estimated sewage flows from Tredyffrin Township in the Valley Creek Drainage Area for treatment in the proposed Valley Forge Sewer Authority sewage treatment plant.

Year	Aug. Flow mgd
1973	0.78
1975	0.84
1980	1.17
1985	1.50
1995	1.85
2010	2.17

It is our understanding that 1985 will be used as the design year for the sewage treatment plant. Accordingly, Tredyffrin's reserve capacity in the sewage treatment plant for a design year of 1985 would be 1.50 mgd.

We have also enclosed a map ($7\frac{1}{2}$' USGS) upon which is delineated the area in Tredyffrin Township to be served by the Valley Forge Sewer Authority sewage treatment plant.

Should you have any questions on the above, kindly advise.

Very truly yours,

GANNETT FLEMING CORDDRY AND CARPENTER, INC.

Howard P. Haines
Howard P. Haines
Pollution Control Division

HPH/mab

147 Encs.

cc: Tredyffrin Township Municipal Authority

Advisory Council
On Historic Preservation
1522 K Street N.W. Suite 430
Washington D.C. 20005

June 24, 1974

Mr. Robert J. Blanco, P.E.
Chief
Environmental Impact Branch
Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pa. 19106

EXHIBIT 2

Dear Mr. Blanco:

The Advisory Council is pleased to inform you that the Memorandum of Agreement for the Valley Forge State Park in Chester County, Pennsylvania, has been approved by the Chairman of the Advisory Council. This completes the Section 106 process and the Environmental Protection Agency may proceed with the proposed construction of wastewater treatment plant. A copy of the Agreement is enclosed.

The Council appreciates your cooperation in the resolution of this matter and commends your contribution to the preservation of our national heritage.

14

Sincerely yours,

Ann Webster Smith

Ann Webster Smith
Director, Office of Compliance

Enclosure

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

Advisory Council
On Historic Preservation
1522 K Street N.W. Suite 430
Washington D.C. 20005

EXHIBIT 2

MEMORANDUM OF AGREEMENT

WHEREAS, the Environmental Protection Agency proposes to fund the construction of the Valley Forge Wastewater Treatment Plant, in Chester County, Pennsylvania; and

WHEREAS, the Environmental Protection Agency has determined that this undertaking will affect the Valley Forge State Park, a property included in the National Register of Historic Places, and pursuant to Section 106 of the National Historic Preservation Act of 1966, has requested the comments of the Advisory Council on Historic Preservation; and

WHEREAS, pursuant to the procedures of the Advisory Council on Historic Preservation, as published in the Federal Register, November 14, 1972, pp. 24146-24148, representatives of the Advisory Council, the Pennsylvania Historic Preservation Officer, and the Environmental Protection Agency have consulted and reviewed the undertaking to determine the nature of the effect; now

'49

THEREFORE:
It is mutually agreed that implementation of the undertaking in accordance with the attached letter of August 15, 1973, from Robert J. Blanco to Robert R. Garvey, Jr., and the proposal entitled "Proposal for Sewage Transmission Facilities Through Valley Forge Park," will satisfactorily mitigate any adverse effect of the undertaking on the National Register property.

Ann Webster Smith (date) May 20-1974
Acting Executive Secretary
Advisory Council on Historic
Preservation

(date) 5-23-74
Environmental Protection Agency

Clement M. Silvestro (date) 6/21/74
Chairman
Advisory Council on Historic
Preservation

(date) 6/4/74
Pennsylvania Historic Preservation
Officer

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
P. O. BOX 1026, HARRISBURG, PENNSYLVANIA 17108

ECUTIVE DIRECTOR

July 3, 1973

EXHIBIT 2

Lamb, Windle and McErlane
26 East Market Street
Box 424
West Chester, Pennsylvania 19380

Attention: Susan P. Windle, Esquire

Dear Ms. Windle:

The enclosed copy of a resolution adopted by the Valley Forge State Park Commission and the amended proposal of the Valley Forge Sewer Authority and the Tredyffrin Township Municipal Authority are forwarded at the suggestion of Alan Spielman, Assistant Attorney General, for your review and use.

Very truly yours,

William J. Wewer

WILLIAM J. WEWER

W s

cc: Alan L Spielman, Esq.

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
P. O. BOX 1026, HARRISBURG, PENNSYLVANIA 17108

XECUTIVE DIRECTOR

July 31, 1973

EXHIBIT 2

Lamb, Windle and McErlane
26 East Market Street
Box 424
West Chester, Pennsylvania 19380

Dear Mr. Windle:

I hereby certify that the following is a true and correct copy of a resolution adopted by the Valley Forge State Park Commission on June 25, 1973, and that said resolution has not been modified and is presently in effect:

WHEREAS, the Valley Forge State Park Commission lacks the expertise to evaluate the environmental impact of the proposal of the Valley Forge Sewer Authority and the Tredyffrin Township Municipal Authority for construction of a sewer line through Valley Forge State Park other than the visual impact of such proposal; and,

WHEREAS, the Environmental Protection Agency is conducting a review of the environmental impact of such proposal as required by the National Policy Act of 1969, 42 U.S.C. Section 4321 et seg,

NOW THEREFORE BE IT RESOLVED, That the Valley Forge State Park Commission accepts the proposal of the Valley Forge Sewer Authority and the Tredyffrin Township Municipal Authority, as amended (a copy of which is attached hereto); provided: (1) site "C" is selected as the location of the pumping station designated in the exhibit for such proposal; (2) that no additional pumping station will be required north of the Pennsylvania Trunpike; and, (3) that if the Environmental Protection Agency finds the proposal to be environmentally unsound, this acceptance shall become null and void.

Very truly yours,

William J. Wewer

WILLIAM J. WEWER

W ss

EXHIBIT 2

August 15, 1973

Mr. Robert R. Garvey, Jr.
Executive Secretary
Advisory Council on Historic Preservation
Washington, D.C. 20240

Dear Mr. Garvey:

This is to inform you of the recent developments surrounding the Valley Forge Sewer Project.

Enclosed, please find a copy of a letter from Mr. Wewer, the Pennsylvania State Liaison Officer, certifying that the Valley Forge State Park Commission has adopted, by resolution, the "Proposal for Sewage Transmission Facilities Through Valley Forge Park", (a copy of which is attached to Mr. Wewer's letter). This proposal was submitted to Mrs. Anna Marie Malloy, Chairman of the Park Commission, in November 1972, by Dr. Joseph Weinstock, Chairman of the Sewer Authority.

The Park Commission's resolution conditions the approval of the proposal by requiring that:

(1) Site "C" is selected as the location of the pumping station originally known as the "Wilson Road Pumping Station";

(2) No additional pumping station would be required north of the Pennsylvania Turnpike; and,

(3) If EPA finds the proposal to be environmentally unsound, their acceptance becomes null and void.

We trust that with the approval of the Advisory Council this agreement is in compliance with Section 106 of the National Historic Preservation Act of 1966.

In addition, you will also find enclosed a list of known historic and archeological sites which are in the project study area. As you are already aware, my staff is presently preparing an Environmental Impact Statement for the Valley Forge Sewer project, and these sites are being evaluated for any environmental impact resulting from the proposed project. It is our preliminary indication that none of these sites would be adversely affected. Of course, the results of our evaluation will be presented in the Draft EIS and sent to you for your review, however; if you have any additions to this list or comments at this time they would be incorporated into our study.

Thank you for your continued cooperation in this matter.

Sincerely yours,

Robert J. Blanco, P.E.
Chief
Environmental Impact Branch

Enclosures (2)

cc: K. Tapman
L. Aten
J. Weinstock
W. Wever
A. Malloy

153

bcc: H. Longest
G. Jones
W. Carter

STOROK/hdf/8/15/73
EIS VALLEY FORGE

EXHIBIT 2

WHEREAS, the Valley Forge State Park Commission lacks the expertise to evaluate the environmental impact of the proposal of the Valley Forge Sewer Authority and the Tredyffrin Township Municipal Authority for construction of a sewer line through Valley Forge State Park other than the visual impact of such proposal; and,

WHEREAS, the Environmental Protection Agency is conducting a review of the environmental impact of such proposal as required by the National Environmental Policy Act of 1969, 42 U.S.C. Section 4321 et seg,

NOW THEREFORE BE IT RESOLVED, That the Valley Forge State Park Commission accepts the proposal of the Valley Forge Sewer Authority and the Tredyffrin Township Municipal Authority, as amended (a copy of which is attached hereto); provided: (1) site "C" is selected as the location of the pumping station designated in the exhibit for such proposal; (2) that no additional pumping station will be required north of the Pennsylvania Turnpike; and, (3) that if the Environmental Protection Agency finds the proposal to be environmentally unsound, this acceptance shall become null and void.

ARLESTOWN-EAST PIKELAND-AND SCHUYLKILL TOWNSHIPS
CHESTER COUNTY, PENNSYLVANIA
801 VALLEY PARK ROAD
PHOENIXVILLE, PENNSYLVANIA 19460

71390

EXHIBIT 2

October 19, 1972

Alan L. Spielman, Esquire
Assistant Attorney General
313 South 25th Street
Philadelphia, Pennsylvania

Re: Valley Forge Park

Dear Mr. Spielman:

In accordance with our conversation, I enclose herewith a proposal for sewage transmission facilities through Valley Forge Park. The proposal is believed to comply with suggestions made by Mr. William J. Wewer of the Pennsylvania Historical and Museum Commission, Mrs. Annamaria Malloy, Chairman, Valley Forge Park Commission, and Mr. Horace Wilcox, Park Superintendent.

An unresolved matter is the location of the "Wilson Road" pumping station. Three alternatives are referred to in the proposal. The site chosen shall be acceptable to the Executive Director of the Pennsylvania Historical and Museum Commission.

As you suggested, a copy of this letter is being hand carried to Mrs. Malloy today for her comments. It is hoped that the proposal will be approved by the Historical and Museum Commission at its November meeting. We have informal assurance from E.P.A. that if the proposal is approved at the November meeting, a grant offer will be made in time for the eight municipalities involved to go out for bids in 1972.

Your cooperation and interest are greatly appreciated.

Very truly yours,

Joseph Weinstock, Chairman
Valley Forge Sewer Authority

JW/is

cc: Mrs. Annamaria Malloy
cc: Mr. William J. Wewer
bcc: Robert S. Gawthrop, Jr., Esquire
Howard P. Haines, P.E.

CHESTER COUNTY, PENNSYLVANIA
801 VALLEY PARK ROAD
PHOENIXVILLE, PENNSYLVANIA 19460

EXHIBIT 2

AMENDED

PROPOSAL FOR SEWAGE TRANSMISSION FACILITIES THROUGH VALLEY FORGE PARK

In order to reach accord and formal agreement giving various sewer authorities permission to construct and operate sewerage facilities in and adjacent to the Valley Forge State Park, the Valley Forge and Tredyffrin Authorities make the following proposal. It is hoped that agreement in principle has been reached and that authority will be granted to appropriate persons to implement the agreement.

I. Regarding Construction of Facilities

The contract documents will provide for installation of facilities so as not to have an adverse effect on the National Register Property. Specifically the documents will provide the following:

A. No blasting will be done near Washington's Headquarters. No blasting will be done which will carry an effective shockwave within 200 feet of any historic building within Valley Forge State Park.

B. The pipe to be rerouted to avoid archaeological resources such as the Grist Mill. If, during the course of excavation other archaeological resources are found, the State Liaison Officer will be notified and excavation will be suspended for a reasonable period of time to allow for his evaluation and that of the Pennsylvania Historical and Museum Commission.

C. Construction to be scheduled to minimize interference with park operations, as approved by the Executive Director of the Pennsylvania Historical and Museum Commission.

D. The force main trench to be kept to a minimum of approximately five (5) feet in width and eight (8) to ten (10) feet in depth, and all ground disturbed by excavation or other activities of construction and installation to be restored to its original condition.

E. Construction to be designed to prevent damage to Valley Creek by siltation or degradation of its banks.

F. Installation of the pipeline not to prevent any land use over the pipes by the Park other than for permanent structures.

II. Regarding Operation and Maintenance of Facilities

The Valley Forge Park Commission shall allow for normal operational entrance to pump stations and metering facilities over prescribed ates.

The Valley Forge Park Commission shall allow access to any pipelines or sewer appurtenances requiring inspection or maintenance.

III. Regarding Sewage Service to the Park

In order to serve the Park, the Sewer Authorities will provide service within the following guidelines:

A. The Authorities will provide a service connection point at either or both pump stations. For safety and protection of the environment, direct connections to the force main in other locations would be allowed only through a pump station which was designed, constructed and operated by the Authorities.

B. Treatment service will be provided to existing Museum Buildings and Administrative Buildings at no charge, and to other buildings as planned for construction in the park.

151 C. Concessions and occupied residences will be charged at normal Authority rates.

D. Latrines will be charged at Authority's normal bulk rates.

E. The Park shall convey sewage to the pump stations through lines designed and installed by the Valley Forge Park. The design and installation of the lines shall be acceptable to the applicable Authority and shall meet the normal requirements of such Authority.

he Valley Forge Sewer Authority will put its small pump station at greater depth to provide as much gravity service as possible to he Park in the northern end. Specifically this would be for service o the Headquarters, the Railroad Station, the Administration Building and the concessions.

rk facilities on the west side of Valley Creek along Route 23 ve been included in existing designs.

V. Regarding the Location of Pump Stations

A. Valley Forge Sewer Authority Pump Station and Force Main

The Park shall allow for construction and operation of a buried pump station and force main on the west side of Valley Creek. The attached Exhibit "A" shows the location of the desired rights-of-way and pumping station site.

B. Tredyffrin Authority Pump Station and Force Main

Exhibit "B" covers the routing of the major force main through the Park and the alternative locations of the Tredyffrin Pump Station.

Location A - (Exhibit "B") shows the pump station in the vicinity of Lafayette's Headquarters. This site, from the viewpoint of cost to the residents of Chester County and from the viewpoint of service areas that can be easily covered, is the ideal location. This is simply because the site is the lowest in the area which results in shallower pipeline construction and the ability to collect sewage from other areas by gravity.

The current estimated construction cost of this pump station is $600,000.

Exhibit "B" also shows general areas "B" and "C" which are respectively north and south of the Pennsylvania Turnpike. These sites are technically feasible but do result in higher costs and loss of service areas by gravity. Those areas lost to gravity service would have to be picked up by additional pumping stations. The engineering estimates show that for site "B" the additional construction costs over site "A" would be about: 15

$100,000	for access road and site work
$100,000	for increased station cost
$200,000	

Increased operating costs would be about $10,000 per year.

For Site "C" the following additional costs over Site "A" would be about:

$170,000	for access road and site work
$100,000	for increased station cost
$150,000	for one additional pumping station and force main
$420,000	

Increased operating costs would be approximately $10,000 per year.

With the location of the Tredyffrin pumping station other than its original location (Site "A"), it will be necessary for the Park to pump sewage from any development in the southern end of the Park.

The Executive Director of the Pennsylvania Historical and Museum Commission shall have authority to approve the Tredyffrin Township pumping station site unless a site south of the Turnpike is chosen. If a site north of the Turnpike is desired, the Tredyffrin Township Municipal Authority will submit its choice of site to the Executive Director for his approval. The Executive Director shall have authority to make, execute and deliver on behalf of the Pennsylvania Historical and Museum Commission deeds granting rights-of-way and easements for pumping station sites referred to herein and any other appropriate documents in furtherance of the purposes set forth herein.

It is agreed that the Executive Director of the Pennsylvania Historical and Museum Commission shall have authority to approve architectural and landscaping features.

15

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
P. O. BOX 1026, HARRISBURG, PENNSYLVANIA XXXXX 17120

EXECUTIVE DIRECTOR

May 16, 1973

EXHIBIT 2

Dr. Joseph Weinstock
Chairman
Valley Forge Sewer Authority
801 Valley Park Road
Phoenixville, Pennsylvania 19460

Dear Dr. Weinstock:

You have informed me by telephone that an environmental impact statement for the proposed installation of a sewer line through Valley Forge Park cannot be prepared until the design and location of the pumping station and the location of lines has been approved by the Commonwealth..

A letter to this effect from the Environmental Protection Agency, as the agency responsible for preparation of the impact statement, may be helpful in moving our problem toward a solution.

Very truly yours,

WILLIAM J. WEWER

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
P. O. BOX 1026, HARRISBURG, PENNSYLVANIA 17108

EXECUTIVE DIRECTOR

May 24, 1973

EXHIBIT 2

Dr. Joseph Weinstock
Chairman
Valley Forge Sewer Authority
P. O. Box 629
Phoenixville, Pennsylvania 19460

Dear Dr. Weinstock:

As you know, the Pennsylvania Historical and Museum Commission approved the proposal of the Valley Forge Sewer Authority for installation of sewer lines through Valley Forge State Park, in November 1972. Our Commission's approval required concurrence of the Valley Forge Park Commission. Copies of the action taken by the Pennsylvania Historical and Museum Commission were sent to you and to Mrs. Annamaria Malloy. To date, concurrence of the Valley Forge Park Commission has not occurred.

I have noted your letter of May 15th to Mrs. Malloy and sincerely hope that it, along with our efforts, may lead to a desirable concurrence by the Valley Forge Park Commission.

Very truly yours,

WILLIAM J. WEWER

COMMONWEALTH OF PENNSYLVANIA
VALLEY FORGE STATE PARK COMMISSION
VALLEY FORGE, PENNSYLVANIA 19481

May 25,
1973.

EXHIBIT: 2

Mr. Joseph Weinstock,
Chairman
Valley Forge Sewer Authority,
808 Valley Forge Road,
P.O. Box 629,
Phoenixville, Pennsylvania 19460.

Dear Mr. Weinstock:

Reference is made to your letter dated May 15, 1973, requesting this Commission to take the necessary formal action for you to proceed with your sewer project.

It is my duty to inform you that the Park Commission at its regular monthly meeting on Monday, May 21, unanimously agreed that formal action cannot be taken until the Environmental Protection Agency submits the impact study presently in progress. 162

Sincerely,

Annamaria Malloy

(Mrs.) Annamaria M. Malloy
Chairman

AMM:heb

May 31, 1973

Mrs. Anna Maria Malloy
Chairman
Valley Forge State Park Commission
Valley Forge, Pennsylvania

EXHIBIT 2

Dear Mrs. Malloy:

As you are aware, two members of my staff, Anthony Donatoni and Steven Torok, are presently engaged in the preparation of an Environmental Impact Statement for the Valley Forge Sewer Project. They have encountered certain difficulties in the course of their work and it is in reference to a specific problem that I am writing to you and asking for your assistance.

The problem relates to the acceptance and approval of a pumping site location originally planned for installation in the vicinity of Wilson Road.

Dr. Weinstock has previously presented to you for comment a "Proposal for Sewage Transmission Facilities Through Valley Forge Park." Among other things, the matter of approving a site for the pump station is included. The document outlines three (3) possible site locations and their associated discriptions. To date, EPA has not received any word on the results of this proposal.

Therefore, I am respectfully requesting that you review Dr. Weinstock's proposal and submit your views to EPA. If possible, we would appreciate your position on the following:

1) What official action has been taken by the Park Commission with respect to this proposal to date?

2) Is the Park Commission in agreement with the proposal and has a site location been selected and approved from alternatives A, B, or C? or

3) Is the Park Commission in disagreement with the proposal whether in total or in part? If the Commission cannot endorse all or part of Dr. Weinstock's proposal, please state specifically your points of contention and rationale for dissent. Also, indicate your views as to how you feel these points of contention can be alleviated (eg. counter proposal).

Before we can complete the environmental study and the Environmental Impact Statement process for this study, compliance with Section 106 of the National Historic Preservation Act of 1966 is mandatory. This involves a tripartite agreement between EPA, the State Liaison Officer, Mr. William Weaver, and the Advisory Council on Historic Preservation. Before this can take place, an agreement between the Park Commission and the Sewer Authority must be secured.

I hope this matter can be resolved shortly. Should you have any questions concerning this request please call upon either Mr. Donatoni or Mr. Torok of my staff at 597-9893.

Your cooperation is greatly appreciated.

Sincerely yours,

Robert J. Blanco, P.E.
Chief
Environmental Impact Branch

cc: Dr. Joseph Weinstock
Chairman, Valley Forge Sewer Authority

Mr. William J. Weaver, Penna. Historical and Museum Commission

Mr. Robert R. Garvey
Executive Secretary
Advisory Council on Historic Preservation

bcc: H. Longest
G. Jones
W. Carter

480
ADONATONI,hdf/5/31/73
EIS VALLEY FORGE

May 31, 1973

Mr. William J. Wewer
State Liaison Officer
Pennsylvania Historical and
Museum Commission
William Penn Memorial Museum &
Archives Building
Box 1026
Harrisburg, Pennsylvania 17108

EXHIBIT 2

Dear Mr. Wewer:

This is to inform you of EPA's current involvement in the negotiations between the Valley Forge Sewer Authority and the Valley Forge State Park Commission regarding the location of the pump station originally proposed for installation in the vicinity of Wilson Road at Valley Forge State Park.

I have requested Mrs. Malloy of the Park Commission to comment on the "Proposal For Sewage Transmission Facilities Through Valley Forge Park" submitted to her in or around November, 1972 by Dr. Weinstock of the Sewer Authority. The letter is enclosed and hopefully will produce a solution to this unresolved matter.

Members of my staff are presently involved in preparing an Environmental Impact Statement for the Valley Forge Sewer Project which is contingent upon resolution of the site location for the pumping station between the Park Commission and the Sewer Authority. As you are aware, this resolution must be attained in order that compliance with Section 106 of the National Historic Preservation Act of 1966 be achieved. Due to the time and financial limitations surrounding this project, it would behoove all concerned to reach such an agreement at the earliest possible date.

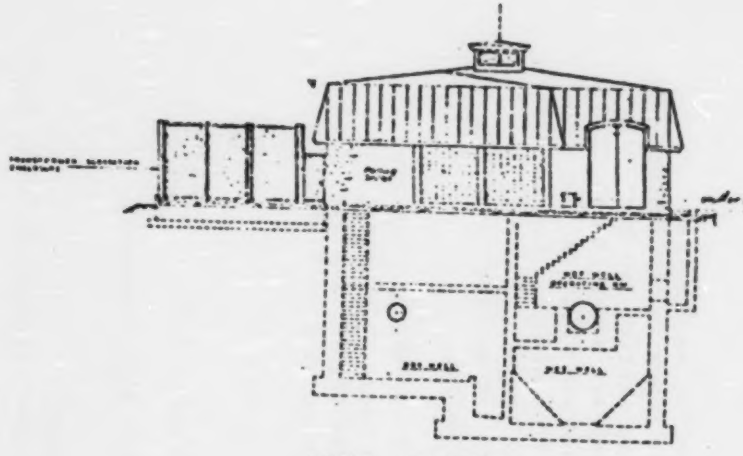
Therefore, I am requesting your assistance as the State Liaison Officer for Historic Preservation in helping to bring this issue to a speedy conclusion. Should you have any questions or desire any information regarding this matter please feel free to call upon me at 215-597-9327.

Sincerely yours,

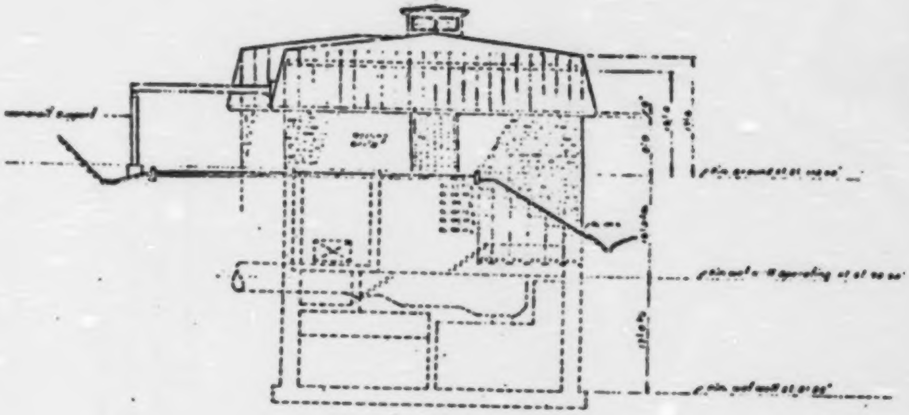
Robert J. Blanco, P.E.
Chief
Environmental Impact Branch

bcc: Henry Longest
Greene Jones
Warren Carter
DONATONI/hdf/5/31/73
EIS-VALLEY FORGE

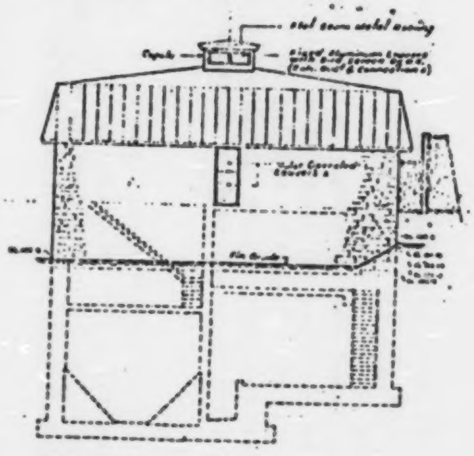
Enclosure
cc: Dr. Joseph Weinstock, Valley Forge, Penna. 19481
Mr. Robert R. Garvey, Jr., Exec. Sectry., Advisory Council On Hist. Presva.



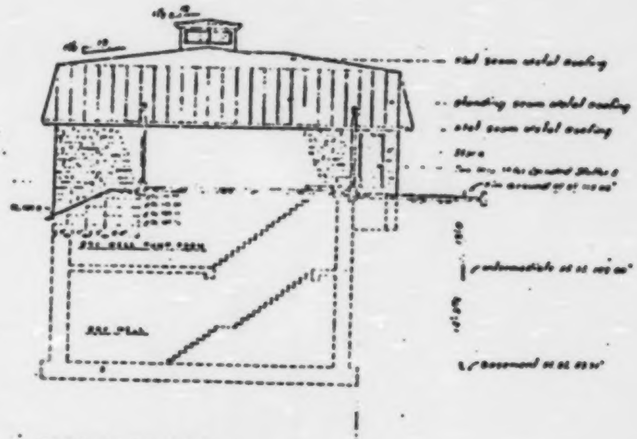
NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION

EXHIBIT 2

REVISIONS		

"6"	GANNETT FLEMING CORDDRY & CARPENTER, INC. ENGINEERS HARRISBURG, PENNSYLVANIA	4895	TREDYFFRIN TOWNSHIP MUNICIPAL AUTHORITY TREDYFFRIN TOWNSHIP CHESTER COUNTY, PENNSYLVANIA SEWAGE PUMPING STATIONS
MCB			
GJS			
GCB		MARCH 1969	WILSON ROAD ARCHITECTURAL ELEVATIONS
HBS			

EXHIBIT 3

ARTICLE V

QUALITY OF SEWAGE

5.01 General. The sewage delivered to the Treatment Plant by any municipality or municipality authority shall be within the maximum limits presented below or pretreated to within the limits of Section 5.04.

5.02 Acceptability Standards. The Valley Forge Sewer Authority shall from time to time establish acceptability standards for sewage and industrial waste entering the collection system of any municipality or municipality authority which discharges sewage (directly or indirectly) to the Treatment Plant for the purpose of prohibiting materials or characteristics which would be deleterious to the Valley Forge Sewage Treatment Plant or the treatment process, which standards shall be reasonable and similar to standards imposed with regard to similar facilities. No municipality or municipality authority shall permit discharge directly or indirectly to the Treatment Plant of any sewage or waste so certified to be deleterious, but such certification shall not preclude the municipality or municipality authority from contesting the reasonableness of such determination.

Subject to the foregoing, all municipalities and municipality authorities agree to enact or adopt or cause to be enacted or adopted uniform ordinances, resolutions, rules or regulations to prohibit users of the respective collection systems serving such municipalities from discharging substances failing to meet such acceptability standards and to require all pre-treatment of sewage or other waste necessary to require the same to conform to the acceptability standards and agree to take all necessary steps in the design and construction of the collection system and in the subsequent maintenance and operation thereof (including the exercise of appropriate inspection of and control over building connections) to prevent infiltration of storm water and other improper substances into the collection systems.

5.03 Sampling Manholes. For the purpose of determining the characteristics of sewage or wastes, each municipality or municipality authority shall install or cause to be installed a sampling manhole at the point of discharge at the property of any user which the consulting engineer of such municipality or municipality authority considers capable of discharging sewage or wastes not meeting any of such acceptability standards.

5.04 Industrial Wastes. In order to control admission of industrial wastes, no party to this Agreement shall permit any industrial user to connect to or discharge into its collection system any waters or wastes other than sanitary waste without the prior review and approval of the Consulting Engineers. The Consulting Engineers' review (until such time as the following acceptability standards are amended in accordance with Section 5.02 hereof) shall be based on, but not limited to, the following standards:

Waste Characteristics to be Considered. Characteristics of the industrial waste shall not be in general in excess of those listed below:

(a) The 5-day 20 degree centigrade B.O.D. (bio-chemical oxygen demand) shall not exceed 250 ppm.

(b) The suspended solids content shall not exceed 300 ppm.

(c) The total solids content shall not exceed 1,100 ppm.

(d) The pH shall not be less than 6.0 nor shall it exceed 9.0.

(e) The temperature shall not exceed 150° F. The waste shall not contain any material requiring unusual processing or expense at the Treatment Plant.

(f) The color shall not be such as to require special treatment to render the effluent acceptable for discharge into the Schuylkill River.

(g) The waste shall not contain grease and oil, inflammable material, non-biodegradable material or any oxygen scavenger, sufficient in quantity to be injurious to the Treatment Plant or interfere with any treatment process or to constitute a hazard to human or animal life.

(h) The waste shall not contain any other solid or viscous material capable of causing obstruction to the flow in the sewers or at the Treatment Plant or any material capable of causing interference with the proper operation of the Treatment Plant.

Where required, in the opinion of the Consulting Engineers, the user shall provide at his expense such preliminary treatment or handling as may be necessary to modify the objectionable characteristics or control the quantities and rates of discharge of such water or wastes as necessary.

Plans, specifications, and any other pertinent information relating to proposed preliminary treatment or handling facilities shall be submitted for review to the Authority and no construction of such facilities shall be commenced until a permit for the connection is obtained in writing from the Authority. Authority shall give a copy of each such permit to Tredyffrin Township and to the municipality in which the industrial user is located.

In order to insure quality compliance and to reduce the possibility of accidental discharges of wastes not conforming each municipality and municipality authority shall sample, test or otherwise examine industrial wastes as often as reasonably necessary to insure quality compliance.

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5.05 Combined Sewage and Industrial Wastes. In order to control the sewage entering the Treatment Plant, Authority will sample the discharge from each municipality or municipality authority periodically to insure that no characteristic is evident which would be deleterious to the Treatment Plant or the treatment process.

The characteristics of each combined sewage and industrial waste discharge shall not be in excess of those listed under Section 5.04 except that the temperature of the combined discharge shall not exceed 100° F.

Each municipality or municipality authority shall provide facilities to prevent the occurrence of septic conditions in the sewers and the sewage delivered to the Treatment Plant.

Should Authority find either the BOD or suspended solids characteristics exceeded as determined in the tests on the periodically obtained samples, the potentially offending municipality or municipality authority shall be notified of the findings and requested to examine the conditions. If at the end of a quarter, Authority determines that the discharge from the municipality or municipality authority is in excess of the characteristics as determined by average test results by periodic sampling, the suspected offender shall be given written notice that its discharge is in excess and that a comprehensive sampling and testing program will be undertaken by Authority to verify the non-compliance and to notify that steps should be taken to rectify the problem.

If, at the end of the quarterly comprehensive test program the problem has not been rectified, a penalty charge as provided in Section 5.06 will be added to that quarter's billing and until the situation is shown to be corrected.

Should Authority find any of the additional characteristics to be in excess or to find the presence of any other untested deleterious material in the course of periodic sampling and testing, the potential offending municipality or municipality authority shall be given notice to take immediate steps to rectify the problem.

5.06 Penalty Charge for BOD and Suspended Solids Excesses. A penalty charge will be added to the Treatment Plant operating expense charge of any municipality or municipality authority in violation as described in Section 5.05 based on deviations in excess of 250 ppm. of 5-day 20 degree centigrade B.O.D. and 300 ppm. suspended solids content. The penalty charge will consist of a multiplier factor applied to the quarterly volume.

The multiplier shall be determined as follows:

$$\text{Multiplier} = 1.00 + \frac{\text{BOD}_5 - 250}{1000} + \frac{(\text{Suspended Solids} - 300)}{1000}$$

Any member of the formula giving a negative value shall be disregarded. BOD_5 and suspended solids figures shall be the average over a quarterly period based on analyses taken five (5) per week. The method of analyses shall be as described in the most recent edition of "Standard Methods of Analyses of Water and Wastewater."

POWER REQUIREMENTS

Pumping Stations		Power Requirements		Source of Service			
		Pumps	Connected Loads		Service Line	Stand-by	Ratings
Charlestown Road	(Schuylkill Twp.)	5.6 KW	7 KW	Phila. Electric Co.		Generator	15 KW
Perkiomen Junction	(Schuylkill Twp.)	3.7 KW	5 KW	"		None run from main plant.	
Valley Creek	(Schuylkill Twp.)	5.6 KW	7 KW	"		Generator	22.4 KW
Pot House Road	(Schuylkill Twp.)	93.3 KW	250 KW	"	34.5 KV	Generator	305 KW
Sandra Lane	(Schuylkill Twp.)		5 KW	"		Generator	
White Horse Road	(Schuylkill Twp.)	111.9 KW	287 KW	"	34.5 KV	Generator	375 KW
Pickering Creek - Present	(Schuylkill Twp.)	186.6 KW	437.2 KW	"	2 x 34.5 KV)	One of two separate service lines 34.5 KV.	
Pickering Creek - Future	(Schuylkill Twp.)	186.6 KW	623.7 KW	"	2 x 34.5 KV)		
Kimble Drive	(E. Pikeland Twp.)		9 KW	"		Generator	30 KW
French Creek	(E. Pikeland Twp.)	93.3 KW	250 KW	"	34.5 KV	Generator	305 KW
#1	(Malvern Boro)	11.2 KW	15 KW	"		Generator	
#2	(Malvern Boro)	14.9 KW	20 KW	"		Generator	
#3	(Malvern Boro)	5.6 KW	7 KW	"		Generator	
#1	(Willistown Twp.)		50 KW	"		Generator	
#2	(Willistown Twp.)		60 KW	"		Generator	
#3	(Willistown Twp.)		250 KW	"		Generator	
Deer Run Lane	(E. Whiteland Twp.)	5.6 KW	7 KW	"		Generator	
Clovelly Road, Berwyn	(Easttown Twp.)		375 KW	"		Generator	
Valley Forge Rd., Berwyn	(Easttown Twp.)		375 KW	"		Generator	
Lindsey Drive, Berwyn	(Easttown Twp.)		375 KW	"		Generator	
Leopard Road, Berwyn	(Easttown Twp.)		375 KW	"		Generator	
Morris Lane, Doylesford Area	(Easttown Twp.)		90 KW	"		Generator	
Darby Road, Paoli	(Easttown Twp.)						
Wilson Road	(Tredyffrin Twp.)		1,100 KW	"		Generator	
Treatment Plant	(Schuylkill Twp.)		1,535.6 KW	"	2 x 34.5 KV	One of two separate service lines 34.5 KV.	

C. C. COLLINGS AND COMPANY INC.
ESTABLISHED 1934
INVESTMENT BANKERS
THE FIDELITY BUILDING
PHILADELPHIA, PA. 19109
735-1000

December 19, 1972

EXHIBIT 4

Environmental Protection Agency
Environmental Impact Branch,
Region #3
Curtis Building
6th & Walnut Street
Philadelphia, Pennsylvania 19106

Attention: Mr. Anthony Donatoni

Dear Sirs:

In order to expedite the preparation of an Environmental Impact Report in respect of the costs of construction of the sewerage systems, sewage treatment plant and various trunk lines and pumping stations to serve the Townships of Charlestown, East Pikeland, Schuylkill, Tredyffrin, Easttown, East Whiteland and Willistown and the Borough of Malvern, all located in the eastern section of Chester County, Pennsylvania, we have been requested by the Valley Forge Sewer Authority to prepare certain data to determine the overall costs in connection with all such construction.

The Valley Forge Sewer Authority was created by and serves the Townships of Charlestown, East Pikeland and Schuylkill. Each of the other named Townships has created and is served by its independent Municipality Authority.

The program calls for the simultaneous construction of a sewage collection system by each such Authority to serve certain specified drainage areas in its service area. At the same time the Valley Forge Sewer Authority will construct a common sewage treatment plant which has been designed to take care of the combined requirements (including its own) of each Authority.

The Townships do not have any publicly owned sanitary sewerage facilities at the present time. Heavy clay soil in the presently populated areas have negligible percolation and there are numerous areas where malfunctioning privately owned sewage disposal systems cause serious nuisance and health hazards-a situation which the Division of Sanitation, Pennsylvania Department of Health has been actively trying to abate. At the present time there are no significant sources of industrial wastes in any Township.

Following the advice and recommendations contained in various engineering studies made, and after considering alternative plans which were explored and could not be implemented, each Authority has determined to construct a sewage collection system which has been designed with capacities sufficient to provide for the long range needs of its service area in each Township, and, in order to provide for the treatment and disposal of sewage collected therefrom, has entered into an agreement, dated as of November 1, 1970 (the Treatment Agreement) for the construction of a regional sewage treatment plant (the Regional Plant). During 1970, the Delaware Valley Regional Planning Commission amended the Chester County Water and Sewerage Plan, to reflect the approach now being followed for regional sewerage service.

Treatment Agreement (a precis):

The Treatment Agreement provides that the Valley Forge Sewer Authority (the Authority) shall construct and operate the Regional Plant under its terms. In order that all parties shall have a voice and information concerning the construction and operation thereof, a Joint Board, consisting of one member from each of the seven Townships and the Borough which are parties to such agreement, is created having the powers and duties set forth therein. Such powers and duties consist of, for the most part, approval of decisions of a major character, rather than normal and/or routine decisions and functions.

The design capacity of the Regional Plant was determined by totaling the design capacity to be required to 1985 by applicable consulting engineers employed by each party to the Treatment Agreement.

The Authority for the Townships (Charlestown, East Pikeland and Schuylkill) and each other party to the Treatment Agreement will construct and finance, as separate projects, its own sewage collection system and transmission facilities and must include in such financing its share of the costs (as defined) of constructing the Regional Plant, less any governmental grant to be received by the Authority for such purpose. Each party, including the Authority, within a certain number of days of the date on which construction bids are received by the

Authority for such construction, or within a certain number of days from the necessary approval in the event of increased costs, shall make a Capital Contribution representing its share of the total "project cost", as defined, plus an amount equal to its proportionate share of the estimated operating costs for the first two years based upon design capacity, less any applicable grants in respect thereof, less any amounts advanced thereon prior to such date, i.e. engineering fees, et cetera. All such Capital Contributions and any federal and state grants allocable to such construction shall be deposited in a Construction Fund, separate from any other account of the Authority, and expended only upon requisitions of the Authority and in case of payments under construction contracts, only with the approval of the Consulting Engineers, as provided. Copies of all requisitions shall be available to the Joint Board.

The Authority will not issue any bonds, or otherwise finance the costs of constructing the Regional Plant, other than to finance its proportionate share of such costs.

The parties shall share the operating expenses (as defined) of the Regional Plant on the basis of the proportion that the volume of sewage, determined as provided and by other agreements of the parties, emanating from each party, bears to the total volume of sewage received at the Regional Plant, as determined by meter, as provided. Provision is made for payments toward the annual operating expenses by each party, quarterly, on or before January 1, April 1, July 1 and October 1 of each year of its share of such expenses, based upon a budget prepared by the Authority, with the approval of the Consulting Engineers and the Joint Board. Each party's share shall be based upon its estimate of its volume of sewage for the succeeding year which must be supplied to the Authority 120 days prior to the start of each calendar year. Following the close of any calendar year, adjustments will be made to each party based upon the actual volume and actual operating expenses for the preceding year, as determined by audit.

Other provisions usually contained in sewerage agreements are included in the Treatment Agreement.

Valley Creek Trunk Sewer Agreement:

In connection with the construction of its proposed sewage collection system to serve that portion of the Township of Tredyffrin to be served by the Treatment Plant, Tredyffrin Township Municipal Authority and the Township of Tredyffrin have entered into an agreement, dated November 1, 1970, with identical parties including the Authority, which are parties to the Treatment Agreement and to be served by the Treatment Plant, providing for the construction of a large trunk sewer, known as Valley Creek Trunk Sewer. Capital Contributions, similar to those set forth in the Treatment Agreement, as set forth hereinbefore including shares of the net operation expenses for the first two years, are provided for therein by the municipalities to be served by such trunk sewer.

The Regional Plant:

The Plant will be located on the Schuylkill River approximately 2½ miles below the Borough of Phoenixville. The proposed treatment facilities will provide a high degree of secondary treatment with the removal of 95% suspended solids, 95% Total Oxygen Demand and 100% of settleable solids during the summer months. The Plant will contain primary clarifiers, aeration tanks, final settling tanks, filtration and chlorination as a mainline stream flow. The disposal of primary and waste activated sludge will be by fluid bed incineration. Incineration is provided by sludge thickening conditioning by heat treatment, and centrifuging. Stack emission criteria will be established to meet State requirements.

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The basic design capacity is for 8 million gallons daily estimated in 1985. The capability of doubling the design capacity is provided as a minimum.

In order to ascertain the overall costs of the combined projects and the result and charges to be borne by the users of the divers facilities to be constructed, we have prepared several tables; as follows:

1. Table showing proportionate shares under the Treatment Agreement and Valley Creek Trunk Sewer Agreement. Calculated using Consulting Engineers' estimates of cost, and adjusted to reflect Federal Grants at 75%. It should be mentioned that, as the Federal Grant ratio increases, the Pennsylvania annual subsidy towards operating costs decreases.

2. Table showing proportionate shares of the costs of operating the Regional Plant and the Valley Creek Trunk Sewer, based upon Consulting Engineers' estimates, and using design capacity as a base, less applicable Pennsylvania subsidy. Such costs will actually be shared on usage in the future, as set forth in the Treatment Agreement.

3. A table has been prepared for each Authority, showing (a) Bond Proceeds - that is the compilation of the various items to be financed and to be included in the Bonds to be issued by each Authority. The construction costs, engineering, contingencies, etc., were supplied by the applicable Consulting Engineer/s involved. Other items, including costs of financing were estimated by us, and were computed on a basis consistent throughout. (b) Annual Requirements for debt service and operating costs taking into consideration certain rates to be used for front foot assessments, and the resultant annual charge to be made for each equivalent dwelling unit to be served. The number of assessable front feet and the equivalent dwelling units were estimated by the applicable Consulting Engineer/s. In each case the front foot assessment rate used was taken from certain indications used heretofore in divers feasibility studys.

The tables are to be read with a full consideration of the purpose for which they were prepared - to arrive at the general overall financial impact upon the citizens of the areas to be served. They are not intended in any way as feasibility reports, nor is any indication of the amounts of rates for assessment or annual charges to users implied. These can be determined only by each Authority after acceptable construction bids have been received and all costs have been determined by the many Consulting Engineers involved.

The aggregate principal amount of bonds estimated to be issued is $29,990,000.

With assessment rates ranging around $12/15 per front foot, the annual sewer user rates vary, but, in our opinion, all are within feasible ranges for financing purposes. This variance is caused by the requirement to construct facilities initially of design capacities to accomodate future users and which will initially be used by a lesser number of users.

Detailed amortization tables were not compiled, but a tapping fee charge in each case will be required to produce the necessary revenues during the first five year period until all connections or equivalent dwelling units, as estimated, have been connected to the systems.

A utility service provided and financed by a public body is more economical than a like service provided by a private corporation. The use of gravity flow down one watershed area to the fullest extent possible, which is the basis of the program, is always more economical than pumping. The Consulting Engineers could expand on this.

Some economic indicators of the area are:

MUNICIPALITY	*MEDIAN VALUE OWNER OCCUPIED DWELLING UNITS 1970	Taxable Real Estate	
		+ASSESSED VALUATION 1973	≠ESTIMATED TOTAL MARKET VALUE 1973
Valley Forge			
Charlestown Township	$30,400	$ 5,782,656	$ 16,381,500
East Pikeland Township	21,700	9,176,736	24,085,900
Schuylkill Township	28,700	12,879,944	33,805,600
Tredyffrin Township	40,000	75,579,927	214,715,700
East Whiteland Township	25,600	22,652,548	64,171,500
Malvern Borough	16,800	4,995,151	14,150,600
Easttown Township	38,400	27,403,212	77,850,000
Willistown Township	31,700	23,376,042	66,221,100

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*From U. S. Bureau of the Census - 1970.

+From Chester County Assessor's office - 12/19/72.

≠Estimate is based upon the latest information published by the State Tax Equalization Board on June 30, 1972 for 1971.

Charlestown, East Whiteland, Malvern and Willistown comprise the Great Valley School District, 1971 ratio assessed to market - 35.3%.

East Pikeland and Schuylkill (together with Phoenixville) comprise the Phoenixville Area School District, 1971 ratio - 38.1%.

Tredyffrin and Easttown comprise the Tredyffrin-Easttown School District, 1971 ratio - 35.2%.

We trust the above is informative.

Very truly yours,

C. C. COLLINGS AND COMPANY, INC.

Thomas Brennan

Thomas Brennan
Chairman of the Board

TB/cv

CAPITAL CONTRIBUTIONS

PROPORTIONATE SHARES OF "PROJECT COST" UNDER VALLEY FORGE SEWAGE PLANT AGREEMENT DATED NOVEMBER 1, 1970 AND "PROJECT COST" UNDER VALLEY CREEK TRUNK SEWER AGREEMENT, DATED NOVEMBER 1, 1970, TOGETHER WITH SHARES OF NET OPERATING EXPENSES AS ESTIMATED FOR THE FIRST TWO YEARS ON BASIS OF RESERVED CAPACITY, LESS APPLICABLE GRANTS.

	TREATMENT PLANT				VALLEY CREEK TRUNK SEWER				
AGREEMENT PARTY	Reserve Capacity Percent	Project Cost	Operating Expenses	Capital Contribution	Reserve Capacity Percent	Project Cost	Operating Expenses	Capital Contribution	Total Both Agreements
VALLEY FORGE SEWER AUTH.	26.60%	455,145	$109,167	$ 564,312	0.17%	$ 3,546	$ 240	$ 3,786	$ 568,098
TREDYFFRIN TWP. MUNICIPAL AUTH.	19.90%	340,503	81,670	422,173	39.03%	814,219	55,155	869,374	1,291,547
EAST WHITELAND MUNICIPAL AUTH.	21.20%	362,747	87,006	449,753	28.65%	597,678	40,487	638,165	1,087,918
MALVERN MUNICIPAL AUTH.	7.05%	120,630	28,933	149,563	7.47%	155,834	10,556	166,390	315,953
WILLISTOWN TWP. MUNICIPAL AUTH.	13.30%	227,572	54,584	282,156	11.83%	246,790	16,717	263,507	545,663
EASTTOWN MUNICIPAL AUTH.	11.95%	204,473	49,043	253,516	12.85%	268,069	18,159	286,228	539,744
	100.0%	$1,711,070	$410,403	$2,121,473	100.00%	$2,086,136	$141,314	$2,227,450	$4,348,923

PREPARED BY
C. C. COLLINGS AND COMPANY, INC.
THE FIDELITY BUILDING
PHILADELPHIA, PENNSYLVANIA 19109

EAST WHITELAND MUNICIPAL AUTHORITY

BOND PROCEEDS

CONSTRUCTION		
*CONTRACT #1	$ 716,000	
*CONTRACT #2	2,014,000	$2,730,000
ENGINEERING, INSPECTION, ETC.		339,000
CAPITAL CONTRIBUTIONS (See Schedule)		
VALLEY FORGE AGREEMENT	$ 449,753	
VALLEY CREEK AGREEMENT	638,165	1,087,918
LAND AND RIGHTS OF WAY		100,000
ASSESSMENT EXPENSES		31,000
BOND AND LOCAL COUNSEL		40,000
PRINTING, RATINGS, ADVERTISING, ETC.		5,000
		$4,332,918
LESS:		
MALVERN'S SHARE OF JT. SEWER (30.55%)	$ 50,979	
E.P.A. GRANT (75%)	574,166	625,145
		$3,707,773
CAPITALIZE ONE YEAR'S DEBT SERVICE		235,000
INTEREST DURING CONSTRUCTION (2 YRS)		500,450
BOND DISCOUNT		104,050
		4,547,273
LESS INTEREST INCOME ON FUNDS		187,273
BOND ISSUE		$4,360,000

*INCLUDES CONTINGENCY

		CAPITALIZE	
		INT	B/D
ASSESSMENTS			
83,000 FEET @ $14	$1,162,000		
@ 85%	988,000		
ISSUE ASSESSMENT BONDS 4%	990,000	$ 79,200	$ 19,800
ISSUE REVENUE BONDS 6 1/4%	3,370,000	421,250	84,250
	$4,360,000	$500,450	$104,050

ANNUAL REQUIREMENTS WITH $14.00 ASSESSMENT

DEBT SERVICE		
$3,370M X 69.436 (38 *Periods* @ 6 1/4%)	$234,000	
COVERAGE AT 10%	23,400	
AUTHORITY COSTS	2,000	$259,400
OPERATING COSTS		
EAST WHITELAND	15,000	
VALLEY CREEK (28.65% of $53,314 Net)	18,139	
VALLEY FORGE (21.20% of $189,903 Net)	40,259	73,398
		$332,798
LESS INCOME FROM DEBT SERVICE RESERVE FUND (4 1/2%)		10,575
ANNUAL REQUIREMENT		$322,223
WITH COLLECTIONS AT 97%		332,189

PRESENT UNIT ESTIMATE		ANNUAL RATE	POSSIBLE 300 ADDITIONAL
NOW	1,576	$211	$177
1976	1,726	193	164
1981	1,890	176	152

WITH $12.50 ASSESSMENT ($1,037,500)				$341,000
NOW	1,576	$217	$182	
1976	1,726	198	169	
1981 (10%)	1,890	181	155	

PREPARED BY
C. C. COLLINGS AND COMPANY, INC.

VALLEY FORGE SEWER AUTHORITY

BOND PROCEEDS

CONSTRUCTION COSTS		$6,223,500
ENGINEERING		1,076,359
LAND AND RIGHTS OF WAY		238,000
CONTINGENCIES		633,000
TEMPORARY PLANT		147,000
CAPITAL CONTRIBUTIONS (See Schedule,		
VALLEY FORGE AGREEMENT	$ 564,312	
VALLEY CREEK AGREEMENT	3,786	568,098
ASSESSMENT EXPENSE		75,000
BOND AND LOCAL COUNSEL		75,000
PRINTING, RATINGS, ADVERTISING, ETC.		10,000
ADMINISTRATION AND OPERATING		15,000
		$9,060,957
LESS: FEDERAL GRANT (75%)	$2,177,812	
BONDS ISSUED ON PORTION OF PROJECT	1,030,000	3,207,812
		$5,853,145
CAPITALIZE ONE YEAR'S DEBT SERVICE		205,000
INTEREST DURING CONSTRUCTION (2 YEARS)		658,500
BOND DISCOUNT		146,500
		$6,863,145
LESS: INTEREST INCOME ON FUNDS		263,145
		$6,600,000

		CAPITALIZE INT	CAPITALIZE B/D
ASSESSMENTS			
387,000 LESS 37,719 =349,281 @ $12.50	$4,366,000		
@ 85%	3,711,000		
ISSUE ASSESSMENT BONDS	$3,700,000	$296,000	$ 74,000
ISSUE REVENUE BONDS	2,900,000	362,500	72,500
	$6,600,000	$658,500	$146,500

ANNUAL REQUIREMENTS WITH $12.50 ASSESSMENT

DEBT SERVICE		
$2,900M X 69.436 (38 Periods @ 6 1/4%)	$201,500	
COVERAGE AT 20%	40,300	
AUTHORITY COSTS	2,000	
	$243,800	
DEBT SERVICE REQUIREMENT ON 650M 1971 Bonds	55,500	$299,300
OPERATING EXPENSES		
VALLEY FORGE COLLECTION	$132,670	
VALLEY CREEK AGR. (0.17% of $63,316 Net)	108	
VALLEY FORGE AGR. (26.60% of $189,903 Net)	50,514	183,292
LESS: INCOME FROM DEBT SERVICE RESERVE FUND		
($205,000 Plus $48,000) $253,000	11,385	
STATE REIMBURSEMENT	25,676	37,061
		$445,531
WITH COLLECTIONS AT 97%		459,310

PRESENT UNIT ESTIMATE		ANNUAL RATE	WITH EACH ADDITIONAL 100
NOW	2,344	$196	$188
1976	3,394	136	132
1981	3,733	123	120

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TREDYFFRIN TOWNSHIP MUNICIPAL AUTHORITY

BOND PROCEEDS

CONSTRUCTION COSTS	$8,831,075	
TOTAL PROJECT COSTS		$14,130,000
CAPITAL CONTRIBUTION (See Schedule)		422,173
		$14,552,173
LESS:		
CAPITAL CONTRIBUTIONS FROM OTHERS	$1,358,076	
E.P.A. GRANT	5,550,070	6,908,146
		$ 7,644,027
BOND ISSUE (Say)		7,650,000

ASSESSMENTS	
161,000 FEET AT $12	$1,932,000
@ 85%	1,642,200
ISSUE OF ASSESSMENT BONDS	$1,650,000
ISSUE OF REVENUE BONDS	6,000,000
	$7,650,000

ANNUAL REQUIREMENTS WITH $12 ASSESSMENT

DEBT SERVICE	
$6,000 M X 65.303 (38 PERIODS @ 5 3/4%)	$391,900
COVERAGE AT 20%	78,380
AUTHORITY COSTS	2,000
	$472,280
PRESENT LEASE RENTALS	233,900
	$706,180
5% REQUIREMENT OF LEASE	35,309
ANNUAL REQUIREMENT	$741,489
OPERATING COSTS	
PRESENTLY (EXCLUDING LEASE RENTALS)	$315,662
VALLEY CREEK AGREEMENT (39.03% of $63,314 Net)	24,711
VALLEY FORGE AGREEMENT (19.90% of $189,903 Net)	37,791
TOTAL ANNUAL REQUIREMENT	$1,119,653
PRESENT RENTALS FROM 6,130 USERS (AV. $78.30)	$ 480,000
OTHER INCOME	83,000
	$ 563,000
TOTAL EXISTING AND 2,600 ADDITIONAL ON PROJECT	8,730
TOTAL ANNUAL REQUIREMENT	$1,119,653
LESS OTHER INCOME	83,000
	$1,036,653
RATE FOR 8,730 USERS	$ 118.75

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C. C. COLLINGS AND COMPANY, INC.

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WILLISTOWN MUNICIPAL AUTHORITY

BOND PROCEEDS

CONSTRUCTION COSTS		$2,384,000
ENGINEERING, ETC.		318,000
CAPITAL CONTRIBUTIONS (See Schedule)		
VALLEY FORGE AGREEMENT	$282,156	
VALLEY CREEK AGREEMENT	263,507	545,663
LAND AND RIGHTS OF WAY		50,000
ADMINISTRATIVE		19,000
BOND AND LOCAL COUNSEL		40,000
ASSESSMENT EXPENSE		30,000
CONTINGENCIES		235,900
		$3,622,563
LESS: FEDERAL GRANT (75%)		478,336
		$3,144,227
CAPITALIZE ONE YEAR'S DEBT SERVICE		170,000
INTEREST DURING CONSTRUCTION (2 YEARS)		398,725
BOND DISCOUNT		84,525
		$3,797,477
LESS INTEREST INCOME ON FUNDS		177,477
BOND ISSUE		$3,620,000

		CAPITALIZE INT	CAPITALIZE B/D
ASSESSMENTS			
93,675 FEET @ $15	$1,405,125		
@ 85%	1,194,356		
ISSUE OF ASSESSMENT BONDS @ 4%	$1,195,000	$ 95,600	$23,900
ISSUE OF REVENUE BONDS @ 6 1/4%	2,425,000	303,125	60,625
	$3,620,000	$398,725	$84,525

ANNUAL REQUIREMENTS WITH $15 ASSESSMENT

DEBT SERVICE		
$2,425M X 69 436 (38 PERIODS AT 6 1/4%)	$168,382	
COVERAGE AT 10%	16,838	
AUTHORITY COSTS	2,000	$187,220
OPERATING COSTS		
WILLISTOWN	23,000	
VALLEY CREEK (11.83% of $63,314 Net)	7,490	
VALLEY FORGE (13.30% of $189,903 Net)	25,257	55,747
		$242,967
LESS INCOME FROM DEBT SERVICE RESERVE FUND @ 4 1/2%		7,650
ANNUAL REQUIREMENT		$235,317
WITH COLLECTIONS AT 97%		242,600

PRESENT UNIT ESTIMATE	ANNUAL RATE	WITH 100 ADDITIONAL
1,542	$158	$148

WITH $12.50 ASSESSMENT ($1,170,938) $258,000

PRESENT UNIT ESTIMATE		
1,542	$168	$160

PREPARED BY
C. C. COLLINGS AND COMPANY, INC.

MALVERN MUNICIPAL AUTHORITY

BOND PROCEEDS

CONTRACT 1	$594,000	
CONTRACT 2	727,000	
ENGINEERING		$1,321,000
SITES		264,000
CONTINGENCIES		37,000
CAPITAL CONTRIBUTIONS		192,000
EAST WHITELAND TRUNK (30.55% of Net)	50,979	
VALLEY FORGE AGREEMENT (See Schedule)	149,563	
VALLEY CREEK AGREEMENT (See Schedule)	166,350	
ASSESSMENT EXPENSE		366,932
ADMINISTRATIVE		50,000
BOND AND LOCAL COUNSEL		30,000
PRINTING, RATINGS, ADVERTISING, ETC.		35,000
		4,000
		$2,299,932
LESS: FEDERAL GRANT (75%)		209,642
		$2,090,290
CAPITALIZE ONE YEAR'S DEBT SERVICE		
INTEREST DURING CONSTRUCTION (2 YEARS		120,000
BOND DISCOUNT		271,250
		57,250
		$2,538,790
LESS: INTEREST INCOME ON FUNDS		98,790
		$2,440,000

		CAPITALIZE INT	CAPITALIZE B/D
ASSESSMENTS			
70,000 FEET @ $12.50	$ 875,000		
@ 85%	750,000		
ISSUE ASSESSMENT BONDS (4%)	$ 750,000	$ 60,000	$15,000
ISSUE REVENUE BONDS (6 1/4%)	1,690,000	211,250	42,250
	$2,440,000	$271,250	$57,250

ANNUAL REQUIREMENTS WITH $12.50 ASSESSMENT

DEBT SERVICE		
$1,690M X 69.436 (38 PERIODS @ 6 1/4%)		
COVERAGE AT 10%	$117,347	
AUTHORITY COSTS	11,735	
	2,000	$131,082
OPERATING COSTS		
MALVERN		
EAST WHITELAND TRUNK @30.55% of Net	8,500	
VALLEY CREEK (7.47% of $63,316 Net)	1,228	
VALLEY FORGE (7.05% of $139,903 Net)	4,730	
	13,388	27,846
		$158,928
LESS INCOME FROM DEBT SERVICE RESERVE FUND @ 4½%		5,400
ANNUAL REQUIREMENT		$153,528
WITH COLLECTION @ 97%		158,276

PRESENT UNIT ESTIMATE		ANNUAL RATE	WITH 100 ADDITIONAL
NOW	600	$198	$170

POSSIBLE APARTMENTS TO BE BUILT

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EASTTOWN MUNICIPAL AUTHORITY

BOND PROCEEDS

CONSTRUCTION COST		
SEWERS AND FORCE MAINS	$3,027,100	
PUMPING STATIONS (4)	310,000	$3,337,100
LAND AND RIGHTS OF WAY		98,000
		$3,435,100
ENGINEERING DESIGN, PLANS, ETC.		199,200
RESIDENT ENGINEER, INSPECTION, ETC.		134,000
CONSTRUCTION STAKE-OUT		30,300
CONTINGENCIES		400,000
CAPITAL CONTRIBUTIONS (See Schedule)		
VALLEY FORGE AGREEMENT	$ 253,516	
VALLEY CREEK AGREEMENT	286,228	539,744
ASSESSMENT EXPENSES		55,000
BOND AND LOCAL COUNSEL		50,000
PRINTING, RATINGS, ADVERTISING, ETC.		5,000
		$4,848,344
LESS: FEDERAL GRANT (75%)		325,600
		$4,522,744
CAPITALIZE ONE YEAR'S DEBT SERVICE		270,000
INTEREST DURING CONSTRUCTION (2 YEARS)		598,625
BOND DISCOUNT		125,625
		$5,516,994
LESS INTEREST INCOME ON FUNDS		196,994
BOND ISSUE		$5,320,000

		CAPITALIZE INT	CAPITALIZE B/D
ASSESSMENTS			
137,750 FEET AT $12.50	$1,721,875		
@ 85%	1,463,594		
ISSUE ASSESSMENT BONDS (4%)	$1,475,000	$118,000	$ 29,500
ISSUE REVENUE BONDS (6 1/4%)	3,845,000	480,625	96,125
	$5,320,000	$598,625	$125,625

ANNUAL REQUIREMENTS WITH $12.50 ASSESSMENT

DEBT SERVICE		
$3,845M X 69.436 (38 Periods @ 6 1/4%)	$267,000	
COVERAGE AT 10%	26,700	
AUTHORITY COSTS	2,000	$295,700
OPERATING COSTS		
EASTTOWN	$ 18,000	
VALLEY CREEK (12.85% of $63,314 Net)	8,136	
VALLEY FORGE (11.95% of $189,903 Net)	22,693	48,829
		$344,529
LESS: INCOME FROM DEBT SERVICE RESERVE FUND (4 1/2%)		12,150
ANNUAL REQUIREMENT		$332,379
PLUS PRESENT REQUIREMENT		19,260
		$351,639
WITH COLLECTION @ 97%		362,618

PRESENT UNIT ESTIMATE		ANNUAL RATE	WITH 100 ADDITIONAL	
NOW	1,735	$209	$196	
1976	1,908	190	181	
1981	2,099	173	165	
WITH $14.00 ASSESSMENT $1,928,500				$348,826
NOW	1,735	$201	$190	
1976	1,908	183	174	
1981	2,099	166	159	

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ANNUAL OPERATING EXPENSE
ALLOCATION ON RESERVE CAPACITY

	UNDER			
	TREATMENT AGREEMENT		VALLEY CREEK AGREEMENT	
VALLEY FORCE SEWER AUTHORITY	26.60%	$ 50,514	0.17%	$ 108
TREDYFFRIN TWP. MUNICIPAL AUTH.	19.90%	37,791	39.03%	24,711
EAST WHITELAND MUNICIPAL AUTH.	21.20%	40,259	28.65%	18,139
MALVERN MUNICIPAL AUTH.	7.05%	13,388	7.47%	4,730
WILLISTOWN TWP. MUNICIPAL AUTH.	13.30%	25,257	11.83%	7,490
EASTTOWN MUNICIPAL AUTH.	11.95%	22,693	12.85%	8,136
		$189,902		$63,314
TOTAL ANNUAL ESTIMATE	$220,500		$78,000	
LESS STATE SUBSIDY	30,597		14,686	
	$189,903		$63,314	

PREPARED BY
C. C. COLLINGS AND COMPANY, INC.

C. C. COLLINGS AND COMPANY INC.
ESTABLISHED 1924
INVESTMENT BANKERS
THE FIDELITY BUILDING
PHILADELPHIA, PA. 19109
735-1000

May 31, 1974

EXHIBIT 5

Environmental Protection Agency
Environmental Impact Branch
Region #3
Curtis Building
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Attn: Mr. Anthony Donatoni

Dear Sirs:

We have read the "Updated Cost Analysis" (the Report) which has been filed with you and prepared by Buchart-Horn, Inc., Consulting Engineers and Planners, of York, Pennsylvania, updating the costs of the various projects contained in the "Valley Forge" sewerage system to reflect current conditions. Certain costs and assumptions contained therein, other than those pertaining to the Valley Forge Sewer Authority, were furnished by consulting engineers other than Buchart-Horn, Inc.

The report has been prepared based entirely (except for the E.P.A. funding in amounts on the original application only) on engineering practices of estimating costs, assuming in a general way the methods of financing at assumed interest rates and without taking into consideration the divers finer shadings of credits involved. This is the normal and usual practice in such studies by Consulting Engineers and, in general, is sufficient for the purposes intended here.

As pointed out in our letter to you, dated December 19, 1972, this is not intended in any way as a feasibility report nor is any indication of the amounts of rates for assessment or annual charges to users implied. These may be determined only by each Authority after acceptable bids are received for construction and all other costs have been actually determined by the many Consulting Engineers involved and the total amount of moneys to be received from Federal and/or State Grants have been finally determined. Many variables have been used, which may be subject to substantial changes, such as interest rates, the amount of short term bonds which may be issued (bonds secured by assessments on benefited properties may not be compared with Bonds secured by tapping fees) the difference between the "System Construction Costs" and "Project Costs" as shown, compared to the ultimate actual costs, and each Authority's right to determine, in its own judgment, the concept of charges to be made in its service district to be equitable among all of its users.

It is our opinion that the formulae used are correct.

We trust that the above serves its purpose.

Very truly yours

C. C. COLLINGS AND COMPANY, INC.

Thomas Brennan

Thomas Brennan,
Chairman of the Board

TB:ajb

cc: Buchart-Horn, Inc. - Douglas L. McGill, P.E.
Dr. Joseph Weinstock

APPENDIX 7

Environmental Impact

PHILADELPHIA ELECTRIC COMPANY
2301 MARKET STREET
PHILADELPHIA, PA. 19101
(215) 841-5454
MAJOR ACCOUNTS DEPARTMENT

July 11, 1973

EXHIBIT 1

Filson-Gingrich and Minnich, Inc.
2426 North Second Street
Harrisburg, Pennsylvania 17110

Attention: Mr. Eli B. Minnich, P.E.

Dear Mr. Minnich:

Subject: Electric Service to the Premises
Valley Forge Sewer Authority
Valley Forge Plant and Pumping Stations

Pursuant to your letter of May 10, 1973 regarding electrical service for the above projects, enclosed is a print of a schematic diagram of the proposed 33 KV supply and related interconnections for the proposed sewage plant and associated pumping stations. These supply arrangements are current and would be subject to change as the Philadelphia Electric Company system develops.

In accordance with your plan, Philadelphia Electric Company would provide 33KV service to each location. However, we inform you that we now face delays in the construction of new major generating plants due to additional environmental reviews by various regional, state and federal agencies. The situation encompasses both fossil and nuclear fueled plants. We do not know how long these delays will persist. Construction has stopped completely at one major plant and we are proceeding at another even though no permits have yet been granted.

We are gravely concerned as a result of this situation. Our service to this customer depends on placing new plants in service and until we know with some degree of confidence when that will be, we cannot give you firm assurances that service can be provided when desired. It is not our intention to be unduly pessimistic and we are confident that these plants will be built for the service of the public. Nevertheless, timing is critical and the delays we are experiencing are serious enough that you should be aware of the situation.

Other than the general conditions that all electric untilities are operating under, Philadelphia Electric Company, does not anticipate any power shortage in this immediate area.

We hope the above information will help you complete your environmental study and if we can be of any further assistance, please do not hesitate to give us a call.

Very truly yours,

B.E. Buchanan, 3rd

B. E. Buchanan, 3rd
Major Accounts Reprentative

BEB:lyw

Enclsoure

Historic Sites Within Chesterbrook

EXHIBIT 2

Ordinance No. 206 establishes Tredyffrin Township Historical District. Adopted 1/12/66.
Exhibit A of Ordinance identifies 3 historical sites within Chesterbrook area.

DuPortail's Quarters

Built 1740. Registered on National Register of Historic sites.

Brig. Gen. Louis DuPortail, French engineer officer on Washington's staff. Chief Engineer of U. S. Army. Planned defense of Valley Forge.

Original DuPortail map of Valley Forge discovered in attic after 1900. Map now in Pennsylvania Historical Society. Map was basis of restoration work thus far at Valley Forge.

'91

Lee-Bradford House

Built 1776. Registered on National Register of Historic sites.

Maj. Gen. Charles Lee, second in command to Washington at Valley Forge. Occupied these quarters 1778.

Col. William Bradford, Deputy Muster-Master General, also occupied house.

Property bought in 1881 by Alexander J. Cassatt, President of Pennsylvania Railroad.

Capt. John Davis House

Owned by Davis during Revolution. Capt. Davis served with 9th Penna. Regiment at Valley Forge. Barn was used to keep horses of Washington's Army.

Property belonged to Davis family for several generations. Alexander Cassatt bought property and enlarged it. Burned by vandals several years ago. Stone walls still stand.

APPENDIX 8

Public Participation

Chester Valley Knoll Civic Association, Inc.
P.O. BOX 901
FRAZER, PA. 19355

EXHIBIT 2

November 28, 1972

Mr. Edward Furia, Regional Administrator
U. S. Environmental Protection Agency
Region 3 - 6th & Walnut Streets
Philadelphia, Pa. 19103

Re: Valley Forge Sewer Authority

Dear Sir:

At the request of our President Robert Reid, I am transmitting herewith, a petition to your agency signed by 320 residents of East Whiteland Township, requesting an environmental impact study. The residents of Willistown Township who petitioned your agency, do not stand alone on this issue.

We have noted the newspaper releases, wherein you and your agency are reported to have ordered a six month impact study. I trust that our petition herein, will serve to further justify your action.

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We respectfully request that we be made party of record, and to receive notices, reports, and the opportunity to attend hearings if such are scheduled.

Thank you for your courtesy and consideration,

Very truly yours,
Chester Valley Knoll Civic
Association, Inc.
Maxwell Powell, Chairman
Civic Committee

[illegible] Fennemore - 9 Beechwood ave Frazer
[illegible] Hershey - 21 Beechwood Ave Frazer
Sylvia W Bruce 73 Malin Road Malvern
[illegible] Duran 72 Lancaster Pike, Malvern
[illegible] Gleeley 22 Fraser Ave [illegible]
[illegible] Fogerty 33 Prospect Ave Frazer
George D. Crosser R.D. #2 Lanc Pike
Mary D. Matthews 129 Conestoga Rd. Malvern
John C Murray 21 Buck Run
Janie Eustice 15 Elk Drive Frazer
H Elaine McCauley 1 Limekiln Dr. Malvern
Myrtle S. Moore 22 Summit Rd. Malvern 19
Lorraine Burkhardt 40 Village Way Malvern
D H Brunelle 302 Sibley Road

④

John [illegible]

EXHIBIT 3

Ad Hoc Sewer Committee
3 Devon Road
Malvern, Pennsylvania
19355

Mr. Edward W. Furia
Regional Administration
EPA Region 3
Curtis Building
Sixth & Walnut
Philadelphia, Pennsylvania
19106

Dear Mr. Furia:

Enclosed please find a copy of a petition titled: A Petition ~~to~~ the U. S. Environmental Protection Agency from the Undersigned Residents of Willistown Township.

This petition requests the EPA to do an impact study of the sewer system proposed by the Valley Forge Municipal Authority, Chester County, Pennsylvania.

,95 We have obtained 1163 signatures.

The six basic questions we feel should be answered are listed on the petition. In a letter to follow we will go into greater detail on these questions, providing some of the information we have gathered.

Because of the lack of time available in presenting this petition we cannot go into detail at this time.

We would appreciate your consideration of this request, and a reply concerning your decision.

Yours truly,

Joseph B. Gellings

Ad Hoc Sewer Committee

Joseph Gellings, Chairman	3 Devon Road, Malvern, Pa.
Norman Nields	2 Rolling View Drive, Paoli, Pa.
Rita Robertson	131 Spruce Lane, Paoli, Pa.
Helen Joseph	103 Pine Tree Road, Paoli, Pa.
Harold Roeder N14-1232	28 Sunset Drive, Paoli, Pa.
GeorgeFish	14 Sunset Drive, Paoli, Pa.

A Petition to the U. S. Environmental Protection Agency from the Undersigned Residents of Willistown Township

We, the residents of Willistown Township, hereby ask for an Environmental Impact Study to be done by the U. S. Environmental Protection Agency.

The proposed Valley Forge Sewer System should be thoroughly investigated as to its impact on our environment and from the standp of the immense cost proposals.

Listed below are some of the questions that should be investigated:

1) All Existing Problems - Does the area to be sewered in Willistown include, during the initial phase, all the exis public health and stream polluting problem areas?

2) Unnecessary Involvement - Does the area to be sewered in Willistown in fact include mostly areas with no existing public health and stream polluting problems?

3) Plant Location - Is the proposed site of the Sewage Pla and also the trunk lines above or below the Flood Plain?

4) Dollar Value - Are we getting our moneysworth in light of the most current technology, considering the treatment quality expected to be provided?

5) Environmental Impact - What will be the impact of the proposed system on the Schuylkill River considering future conservation programs, recreation facilities, water supply sources, power generating facilities, and other sewage treatment plants?

6) Unbelievable Costs - Are the Federal Grants that are subject to EPA approval adequate to make the proposed plan financially feasible for the majority of the township residents affected?

Signed:

P.O. Box 723
Paoli, Pa. 19301
January 5, 1973

Mr. Robert Blanco
Chief, Impact Branch
Environmental Protection Agency
Independence Square
Philadelphia , Pa. 19106

EXHIBIT 4

Dear Mr. Blanco:

Thank you for granting me the opportunity to express my concern with some of the aspects of the Valley Forge Regional Sewer System, as it was explained to us by our elected officials.

No thoughtful citizen would argue against the immediate correction of any on-site sewage system which is contaminating our water sources. Most citizens in this area also agree that a large, regional system, by its very design should be more efficient and economical. The newspapers, covering numerous public meetings have quoted some startling statements made by our public officials. Our inability to get accurate information at these meetings, has forced us to look in other directions. These are some of my concerns: ;

1. Why is the Valley Forge Regional Sewer Authority established over eight political divisions, while the administration and operating authority lies with only three of these divisions, and the financing responsibility seems to repose with the individual townships? How can they arbitrarily assign the entire cost of such a system to a limited proportion of that population?

2. Why is this regional sewage system laid out according to political boundries, completely disregarding five natural drainage basins which do not lead into the Schuylkill River?

3. If the new state and federal clean streams acts are the enabling legislation for sewer system grants, why is so much of this planned system devoted to areas so remote from the nearest stream?

4. Does this collection system, as described at public meetings, effectively take in every on-site sewage plant, known to contaminate streams in the seven townships and the one boro?

5. Is the Chester County Board of Health satisfied that every complaint about mal-fuctioning on/site sewage systems has been thoroughly investigated, and included in the planned collection system?

6. Why is this multi-million dollar treatment plant being located on a tract of ground which experienced flooding as recently as last spring?

7. If larger treatment plants are more efficient, why is the Valley Forge Sewer Authority considering a separate location on the opposite river bank, and almost within sight of the newly expanded Oaks plant, instead of running the collection lines directly into this modern, in-operation plant?

8.. If the Valley Forge system must have its'own plant, wouldn't it be logical to locate the plant in the center of the area it serves?

9. Will the specification for sewer line construction prepared by the Advanced Biology Students of Conestoga High School, and accepted by the Tredyffrin Sewer Authority, March 8th, 1972, apply to the entire Valley Forge sewer system?

10. According to the plans available to us, this is a secondary treatment plant, depending upon the dilution of Schuylkill River water to complete the job. Will there be enough water available at all times, when this project is in operation?

11. Why has the Philadelphia Electric Company planned a pipeline from the Delaware River to provide enough water for operating the Limerick power plant on the Schuylkill River?

12. What will be the minimum rate of flow, past the site of the Valley Forge Sewage Treatment plant, when both Limerick stations are in operation?

13. How much water will the Delaware River Basin Commission require from the Schuylkill to meet future drinking water and industrial needs? Do these reqirements take precedence over the need to flush secondary treatment sewage plant effluent?

14. With the water authority acknowledging a concern about the supply of potable water in the near future, how can any area afford to pump all of its' used water into a different basin system, instead of recycling within its' own area?

15. How long will secondary treatment effluent be acceptable for discharge into the Schuylkill River?

16. When complete sewage treatment becomes mandatory, can these long, expensive collections to the Schuylkill River be justified?

17. Why is that portion of Willistown Township, which has public service water, scheduled for sewage collection systems, while the much larger area which has on-site wells continues to discharge septic tank effluent into the ground?

18. In the absence of an over-all land use plan for Chester County, and a 1968 Willistown Township land use plan with no sewage system at all, doesn't the sudden introduction of the Valley Forge Regional Sewage plan seem precipitous and prone to unanticipated problems?

19. Why are only certain Willistown taxpayers being called upon to pay for a collection system which is vastly oversized for the area it purports to serve?

20. Why can't we obtain satisfactory evidence that only this specific area needs sewers, and the rest of the township does not need sewers?

21. If this oversized collection system is being installed for developers and speculators, why aren't they sharing the cost?

22. What assurance have we that it is even safe and reasonable to crowd large developments onto flood plains, poorly drained areas, and limestone areas with sinkholes?

23. How can the Valley Forge Sewer Authority assume that it can indeed discharge eight million gallons per day, of secondary treated sewage effluent while the United states Army Corps of Engineers is still holding public hearings on a comprehensive study of the Schuylkill River Basin, as directed by House Document # 529, of the seventy-ninth Congress?

yours truly

Harold Roeder

Harold Roeder
P.O. Box 723
Paoli, Pa. 19301

GREEN VALLEYS ASSOCIATION

BIRCHRUNVILLE, PA. 19421

ERETT G. RODEBAUGH, *President*
ARRIET STONE, *Secretary*
WILLIAM MARSHALL, *Treasurer*

HALFRED W. WERTZ, *Executive Director*
215-827-7843

EXHIBIT 5

December 19, 1972

Mr. Robert J. Blanco
Chief, Environmental Impact Board
EPA, Region III
Curtis Building
6th & Walnut Streets
Philadelphia, Pa. 19106

Dear Mr. Blanco:

Green Valleys Association is a conservation group in northern Chester County with about 700 members. We are interested in the watersheds of French, Pickering Pigeon, and Valley Creeks and Stoney Run.

We ask you to consider spray irrigation as an alternative to conventional waste treatment when preparing the environmental impact statement on the Valley Forge Regional Sewage Authority. We believe that spray irrigation has a more favorable environmental impact than putting treated water directly into a stream.

Spray irrigation is a very effective means of giving a final treatment to human and animal sewage since it acts as a living filter. This provides biological as well as physical and chemical treatment. It can be used in combination with either oxidation lagoons or conventional treatment plants. The nutrients which are difficult and expensive to remove chemically are returned to the ground. The nutrients can enhance plant growth there where it is suitable rather than in the streams where such growth is detrimental.

Spraying also returns water to the ground close to where it is removed, aiding in the recharge of the ground water. Sewers which end up dumping the water into streams are mining the ground water and doing othing to recycle the water and nutrients.

Since woods soil is very absorbent, spray irrigation requires some oods to spray into during the winter. These woods will grow quickly ecause of the fertilization and may be selectively harvested. They lso can provide an attractive view for the homes whose sewage they are reating.

This method of waste treatment is most useful for villages, towns, developments. Green Valleys has convinced the Pennsylvania Department nvironmental Resources that spray irrigation is worthwhile in some tuations and it is being installed at the French Creek State Park to ndle the sewage of the summer crowds there.

Dr. Ralph Heister, the Assistant Executive Director of Green Valleys Association, has a great deal of information concerning the soils, slopes, and current land use in the Valley Creek watershed. If this data would be useful to you, please contact him at Conestoga High School, Berwyn, Pa. [illegible]

Sincerely,
Halfred W. Wertz

Halfred W. Wertz
Executive Director

HWW/am

COMMONWEALTH OF PENNSYLVANIA
VALLEY FORGE STATE PARK COMMISSION
VALLEY FORGE, PENNSYLVANIA 19481

RECEIVED:
JUL 7 1972
P & D Office, MAR

June 30, 1972

EXHIBIT 6

Mr. John O'Neal
Environmental Protection Agency
Curtis Building, Second Floor
Independence Square,
Philadelphia, Penna.

Dear Mr. O'Neal:

At its regular Monthly Meeting on Monday, June 26, 1972 the Valley Forge State Park Commission passed the following motion:

That the Valley Forge Park Commission request that an Environmental Impact Study be made of the effects of the proposed sewer line planned to go through the Park before The Commission makes any decision as to whether they will or will not approve the sewer line.

Very truly yours,

Jeanne M. Simon

Jeanne M. Simon
Chairman of the Property Committee
Valley Forge State Park Commission

JMS:eea

M. MELVIN SHRALOW
Attorney at Law

700 WIDENER BUILDING
1339 CHESTNUT STREET
PHILADELPHIA, PA. 19107
(215) LOcust 3-0300

April 23, 1973

EXHIBIT 7

Mr. Steven A. Torok
Management Agronomist
U. S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Re: Chesterbrook Conservancy
Our File No. 174-1

Dear Mr. Torok:

As I indicated to you in our meeting on April 18, 1973, I represent the Chesterbrook Conservancy, a group of citizens in Tredyffrin Township, Chester County, concerned with the historical and environmental impact of the proposed development of the tract known as "Chesterbrook". 203

I appreciate the time which you and Mr. Donatoni spent with me in reviewing the current situation.

I understand that the involvement of your agency arises out of an application by the Valley Forge Sewer Authority for enlargement of its plant and the construction of additional interceptors. You have told me that an Environmental Impact Assessment is being prepared by consultants to the Valley Forge Sewer Authority, and that this assessment will be the basis for a draft Environmental Impact Statement which will be prepared by you.

Called Mr. [illegible] on 4/24/73
to clarify this

We are vitally interested in this situation and want to review the EIA and comment on it. Therefore, we would appreciate it very much if you would notify us when the EIA has been filed so that we may review it. If a draft assessment is submitted prior to the final EIA, we would also like to have an opportunity to review that.

Thank you very much for your cooperation and for your consideration in this matter.

Very truly yours,

M. MELVIN SHRALOW

MMS:me

cc: Mrs. Ann Platt

A PETITION TO THE U. S. ENVIRONMENTAL PROTECTION AGENCY
FROM THE UNDERSIGNED RESIDENTS OF EAST WHITELAND TOWNSHIP

We, residents of East Whiteland Township hereby request the U. S. Environmental Protection Agency to perform an Environmental Impact Study of the proposed Valley Forge Sewer System.

The proposed System should be thoroughly investigated as to its impact on our environment and from the standpoint of the immense cost proposals.

Listed below are some of the questions that should be investigated:

1) All Existing Problems - Does the area to be sewered in East Whiteland include, during the initial phase I, all the existing public health and stream polluting problem areas?

2) Unnecessary Involvement - Does the area to be sewered in East Whiteland in fact include mostly areas with no existing public health and stream polluting problems?

205 3) Plant Location - Is the proposed site of the Sewage Plant and also the trunk lines above or below the Flood Plain?

4) Dollar Value - Are we getting our moneysworth in light of the most current technology, considering the treatment quality expected to be provided?

5) Environmental Impact - What will be the impact of the proposed system on the Schuylkill River considering future conservation programs, recreation facilities, water [illegible] [illegible], power generating facilities, and other sewage treatment plants?

6) Unbelievable Costs - Are the Federal Grants that are subject to EPA approval adequate to make the project financially feasible for the majority of the township [illegible] affected?

FRENCH AND PICKERING CREEKS
CONSERVATION TRUST, I[illegible].

R. D. 2 Pottstown, Pa. 194[illegible]4

EXHIBIT 8

March 28, 1973

Mr. Robert J. Blanco
Chief of the Environmental Impact Statement Branch
Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pa. 19106

Dear Mr. Blanco:

Enclosed please find copies of papers relating to Chesterbrook, the Valley Forge Sewer Authority, and our Conservation Trust which may be of some help to the Environmental Impact Study which I understand the Environmental Protection Agency is making. At their February meeting, the Valley Forge Park Commission adopted my statement on the Pennsylvania Historic and Museum Commission turn down on Chesterbrook. The reason given for the move, which came unexpectedly at their January meeting, was the price tag of $22 million. Apparently, this price tag was pulled out of the clouds as it has no relation to the figure Mr. Fox has indicated he would accept ($8 million) for the tract. The move was also made without a meeting of the sub-committee of the Pennsylvania Historical and Museum Commission which was appointed some months ago to study the Chesterbrook question. Our Chester County member on the Pennsylvania Historic and Museum Commission, Mrs. Louise John, was supposedly a member of this sub-committee.

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My memorandum on the Valley Forge Sewer Authority was composed at the time the Valley Forge Park Commission met with Dr. Weinstock and when Mrs. Malloy, Mrs. Simon and I examined the Wilson pumping station question with Dr. Weinstock. Recently, I met with Mr. William J. Walker, who represents the three townships that lay to the west of the Park - Charlestown, Schuylkill and East Pikeland. Mr. Walker says that the Yerkes firm does not represent Tredyffrin on the Sewer Authority, another firm does. This may be true, but I am told that Yerkes represents the Township in many other engineering matters. (Yerkes does represent Easttown

Township, I believe.) All this could be easily verified. There appears to be an undeniable tie-up between Tredyffrin Township, the Fox Company, who does employ Yerkes as their hydrolic or sewer engineer, and the Valley Forge Sewer Authority. My personal fear and that of some of the members of Valley Forge Park Commission is that Park Commission approval of the sewer will provide Mr. Fox with the last ingredient he needs to swing his development into action. In this way, the Commission will be giving official blessing to a development that will destroy the Park. Both my husband and I believe that Valley Forge Park will never survive as a Park if the Chesterbrook development is permitted.

On the eastern side the Park already resembles Central Park with high rises going up in the background. Moreover, there is not sufficient room in the Park to accommodate the requests for use - the pressures increase daily - and there is no place to expand but Chesterbrook unless the principle of non-contiguous holdings are excepted. Amongst the enclosures are a map of the Park and a report I gave at a recent Valley Forge Park Bicentennial meeting on land acquisition. The properties are enumerated in order of their importance. You will note that Chesterbrook is first.

To return to the question of the sewer: we live in South Coventry township not far from the three townships which were the nucleus of the Sewer Authority. We work with the officials of these townships in our Conservation Trust which Sam founded in 1967 and of which I am now President as the French and Pickering Creeks flow through them (French Creek through East Pikeland, the Pickering through Charlestown and Schuylkill). Moreover, Sam, as the Legislator for the 155th District, represents half of East Pikeland in Harrisburg. For various reasons, therefore, we want to do what we can to help these townships. They started the Sewer Authority and they need it badly. The dichotomy of holding up the sewer as a member of the Park Commission on the one hand and wanting it for these three townships on the other, worries me. However, I cannot see approving an action which is the green light to destroy the Park as well as an action that also countenances corruption. I have the feeling that if the Sewer Authority is approved as is, Fox will be able to tie into it at little cost after all the poor little old ladies in Willistown have had to pay an inordinate amount for its construction. Moreover, I believe Mr. Fox will insist upon a disproportionate share of the Tredyffrin allowance (1.8mgd) for his use. If his town has 20,000 and not the 9,300 people projected, he will need the entire share!

Do hope this information is some help. I am sending copies of this letter to Mr. Furia, to whom I spoke on the phone just before he left Environmental Protection Agency and to Mr. Longmaid, to whom I have also spoken. If I can be of any further help in this matter, please let me know. All of us who are working to save Chesterbrook for open space and for the Park, pray that something can be done to stop Mr. Fox before May 1st, the day his permit allows him to commence building forty homes in the environs of the DuPortail Headquarters. Once construction on the project begins, it will be hard to stop the remaining development.

Sincerely,

EMM:ml
Encs.

Chester Valley Knoll Civic Association, Inc.
P.O. BOX 201
FRAZER, PA. 19355

EXHIBIT 9

February 5, 1973

Regional Administrator
U. S. Environmental Protection Agency
Region3 — 6th & Walnut Streets
Philadelphia, Pa. 19103

Re: Valley Forge Sewer Authority
Environmental Impact Study

Att: Mr. Steve Torok

Dear Sir:

This has reference to the conference at your office January 18, 1973 with Mr. Robert Reid, President of the Association and myself, in connection with the captioned subject. We wish to thank you and your colleague for the courtesy extended to us.

Enclosed is our written statements confirming our discussions. We trust the within will be made part of the record.

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Very truly yours,
Chester Valley Knoll Civic Ass'n Inc.

Maxwell Powell
Chairman of the Civic Committee

c.c. Robert Reid, President
C. V. K. C. A., Inc.

Before The

U. S. Environmental Protection Agency

In the Matter of the

Environmental Impact Study

of

The Valley Forge Sewer Authority

Comes now the Chester Valley Knoll Civic Association, Inc., to support its petition filed November 28, 1972, and the statements orally submitted to Messrs. Steven Torok and Anthony Don Antoni January 18, 1973, at a conference held in your Philadelphia, Penna. offices; the statements confirmed in writing herein.

1) The proposed site for the sewage treatment plant, is known to lie in a flood plain which was seriously flooded by the past Hurricane Agnes; thus demonstrating the danger inherent in such location.

2) The above noted treatment plant does nil, so it appears, to provide for future industrial and housing developments within the present eight townships comprising the Valley Forge Regional Sewer Authority. It was stated by a representative of the East Whiteland Municipal Sewer Authority, that 60 % of the proposed treatment plant capacity was the estimated usage at the beginning of operations. The addition of future development has not been estimated. If the " Chesterbrook " proposal is approved, it is intended to tie this complex into the Valley Forge Treatment Plant. It is obvious that the latter could not adequately sewer so large a development. If the said treatment plant could be enlarged by additions thereto, the danger of flood plain damage becomes even greater in scope. 210

3) It appears evident that the sites for the raw sewage pumping stations in the plans for Willistown and Tedyfrin Townships are located in areas that would violate natural drainage systems, and the same possibility holds true for East Whiteland Township.

4) There does not appear to be any Land Usse plans in existence for East Whiteland Township, and, we daresay other townships within the regional authority as well.

5) The present sewage construction project for East Whiteland Township is allocated for approximately one-third of the township. This type of planning does not solve the environmental impact, if those areas not sewered would still discharge into Valley Creek.

6) How effective are the criteria and measures now in use at the LANDFILL in East Whiteland Township to decrease or eliminate silt. Due to increased development and increased garbage, the effect on environmental impact becimes quite evident.

7) Pollutants from upstream would continue to flow into the Schuylkill River.

8) The Engineering Feasibility Plans finalized for sewer construction in East Whiteland Township were issued in 1967, and not updated to the present time.

9) It was stated by representatives of the East White Land Township and its Municipal Sewer Authority, that no consideration was given to any new technology and land use treatment plants.

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10) Scientific research supports the use of spray irrigation sites, which return pure water to streams and rivers.

11) Individual treatment plants such as the Levitt-AWT Systems in use in Freehold, New Jersey as a case in point, on enlarged scale strategically located in six locations of the Valley Forge Regional Sewer Authority area, seem to be more desirable and effective. These systems produce no odors, noise or obnoxious waste product sludge. (photostatic copy of article in re this system id attached hereto).

12) Overland seepage upstream and regionalization affects the downstream carry off and pollute the Schuylkill River.

13) The proposed Nuclear plant of the Philadelphia Electric Company at Limerick, Pa., would use water from the Schuylkill River. The river water level would fall, and no water returned to the river.

14) Planning today for yesterdays problems is no solution for the present or the future. It appears that the requirement today is for a secondary

treatment plant, which appears to be only 85% effective in terms of pure water return. If, in the future, it is determined by your agency that tertiary treatment plants are necessary, what costs and engineering changes would result therefrom.

15) With respect to East Whiteland Township, it has been reported that that hazardous conditions exist in a specific area due to septic tank overflow. It appears only six homes were affected. It is not known whether or not, the septic tank conditions were due improper construction of leach and/or drainage fields.

In summary, while we are not opposed per se to the theory of sewers as a means of serving to resolve in some measure the environmental impact, we do point out that careful study and consideration must be given to new technology and alternate means, to achieve optimum results now and for the forseeable future.

Respectfully submitted,

Chester Valley Knoll Civic Ass'n Inc.

By: Robert Reid, President

Maxwell Powell, Chairman
Civic Committee

EAST WHITELAND TOWNSHIP

PLANEBROOK ROAD, FRAZER, PA. 19355

LD REIMENSCHNEIDER
ownship Manager

GARY R. LONG
Administrative Officer

Board of Supervisors
IN L. LEWIS, JR., Chairman
BERT M. BURFORD
LD F. E. JEUNET

TOWNSHIP OFFICE
Niagara 4-2452

TAX COLLECTOR
Niagara 4-2985
CHARLES A. MERROTH

POLICE DEPARTMENT
Niagara 4-3313 Niagara 7-1442
ROBERT A. REDZIG, Chief

7 December 1972

EXHIBIT 10

Mr. Robert Blanco
EPA Region 3
Environmental Impact Branch
Curtis Building, 6th & Walnut Sts.
Philadelphia, Pa. 19106

Dear Mr. Blanco:

It is my understanding that your office is requesting comments relative to an impact study you are making on the Valley Forge Regional Sewage Treatment System.

East Whiteland is a member of this system and wants an opportunity to discuss our thoughts with you.

Please let me know what date will be convenient for such a meeting.

In addition, as soon as the study is completed, we wish to review the written report before it is adopted and released.

I have enclosed for your information a fact sheet on our proposed sewerage system that was mailed to every property owner in the Township.

Thank you for your cooperation.

Very truly yours,

J. Donald Reimenschneider
Township Manager

Enclosure

cc: file
Supervisors
John Haines

EAST WHITELAND

TOWNSHIP

PLANEBROOK ROAD, FRAZER, PA. 19355

ONALD REIMENSCHNEIDER
Township Manager

GARY R. LONG
Administrative Officer

Board of Supervisors
N L. LEWIS, JR., Chairman
RT M. BURFORD
DLD F. E. JEUNET

TOWNSHIP OFFICE
Niagara 4-2452

TAX COLLECTOR
Niagara 4-2985
CHARLES A. MERROTH

POLICE DEPARTMENT
Niagara 4-3313 Niagara 7-1442
ROBERT A. REDZIG, Chief

26 December 1972

EXHIBIT 11

Mr. Anthony Donatoni
Environmental Impact Branch
EPA Region III
Curtis Building
6th and Walnut Streets
Philadelphia, Pa. 19106

Re: Environmental Impact Study

Dear Mr. Donatoni:

The Township of East Whiteland wants to take this opportunity to place on the record several facts which we hope you will consider when you prepare your E. I. S. report.

1. We began planning for a sewerage system in 1963 and completed our feasibility study in 1965. Our original intent was to construct a treatment plant in our Township on the Valley Creek. We had an agreement of sale with the Burroughs Corporation for a tract of land on which the plant would be located. The Pa. Department of Health then increased their standards for purification which made it financially impossible for us to build our own plant. It was obvious that the standards were made more restrictive in order to discourage each municipality from constructing a plant to serve its individual needs. The State decided that regional systems are more efficient and communities should work together and form such systems. In theory, this type of organization is desirable but it has drawbacks. Two drawbacks have confronted us and are causing serious problems:

a. We had to seek out those municipalities desiring to join us in the formation of a regional system. The State suggested we contact Upper Merion Township and study the possibility of "exporting" our sewage to their plant. East Whiteland, Malvern, Willistown and Tredyffrin met with officials from Upper Merion for two years and then they closed the door on us. At no time during this period did the State assist us or ask Upper Merion to give consideration to our request.

EAST WHITELAND

TOWNSHIP

PLANEBROOK ROAD, FRAZER, PA. 19355

D LD REIMENSCHNEIDER
Township Manager

GARY R. LONG
Administrative Officer

Board of Supervisors
DWIN L. LEWIS, JR., Chairman
OBERT M. BURFORD
AR LD F. E. JEUNET

TOWNSHIP OFFICE
Niagara 4-2452

TAX COLLECTOR
Niagara 4-2985
CHARLES A. MERROTH

POLICE DEPARTMENT
Niagara 4-3313 Niagara 7-1442
ROBERT A. REDZIG, Chief

Mr. Anthony Donatoni - Page Two - December 26, 1972

Valuable time was lost as a result of these fruitless meetings and in the meantime the cost of constructing the eventual system inflated. This, as you can see, is one of the drawbacks with a regional system - you are at the mercy of the community or authority controlling the plant site if it is not earnest in its negotiations. Pluralistic systems can work if everybody cooperates and assists each other. Upper Merion had no desire to cooperate because they "did not need us."

b. We now are a working component of the regional plant to be constructed by the Valley Forge Sewer Authority. This group has been cooperative because they need us to defray their costs. However, because we are at the end of the system, the projected rentals to be paid by our residents are on the average $50.00 to $75.00 more per year. This is a second drawback to a regional system - there can be inequities in the costs and we are feeling them. Our municipal authority asked the Valley Forge Sewer Authority whether or not they would be willing to "equalize" costs. Their answer was "no."

2. Although the regional system has inflicted hardship on us because time was lost in planning and because we must pipe our sewage many miles to the treatment plant, we accepted our responsibility in meeting and solving our sewage problems. We now feel other public officials should also fulfill their obligations. We have been planning for sewers for ten years and external forces have always delayed us. We want to move and begin construction and we hope you will recognize our need.

3. We request that the 660 funds be granted subject to a favorable E. I. S. report. What do we do if the grant is not approved? What is the alternative? Do we sit and wait another ten years? We have sewage running down our streets. Delays will only compound the problem. You are concerned with ecology. We also are concerned with our health problems. Are not overflowing septic and cesspool systems a menace?

Mr. Anthony Donatoni - Page Three - December 26, 1972

Without your financial aid, we might not be able to move. We have attempted to meet all your requirements, and, to my knowledge, we have. We have accepted regionalization and have been cooperative. We now want those officials who require this approach to work with us so that the general public will be better served.

Very truly yours,

J. Donald Reimenschneider

J. Donald Reimenschneider
Township Manager

cc: file
Supervisors
John Haines

bert R. Berger
esident,
d of Directors
am S. West
airman,
Trustees
J. L. Coppedge
utive Director

Phoenixville Area
YMCA
Young Men's Christian Association

MEMBER AGENCY - PHOENIXVILLE AREA UNITED FUND

STAFF
Paul S. Kusko
Youth & Camp Director
Edward B. King, Jr.
Physical Director
Jeanne Young
Aquatic Director
Gregory L. Hagerman
Out-Reach Worker
John Nine
Property Superintendent

124 MAIN STREET • PHOENIXVILLE, PENNSYLVANIA 19460 • PHONE (215) 933-5861

May 2, 1973

EXHIBIT 12

Philadelphia Office of E.P.A.
Region III,
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

ATTENTION: Mr. Blanco

Dear Mr. Blanco:

I am writing to your office to inquire about the environmental impact study that is being done related to the extension of sewer service by the Valley Forge Sewer Authority in Schuylkill Township.

Our YMCA is in the planning stage of building a new facility at our outdoor facility, Baker Park, which is located in Schuylkill Township on Pot House Road, between Route #29 and White Horse Road. Our projected timetable for the erecting of this building is 1976. Since the Sewer Authority will not be able to receive the necessary funding until the Environmental Impact Assessment is done to satisfy the conditions for the release of these funds, we would appreciate your cooperation in expediting the necessary administrative data to speed up the process. For us to adequately build this facility with approval by the Township, we would need to have an adequate sewer system hook-up and we would hopefully tie in to the proposed system which would come down Pot House Road by the Valley Forge Sewer Authority.

I would appreciate any service you can render in enabling the Valley Forge Sewer Authority to move ahead with this most important project, which would not only serve the YMCA, but thousands of other people to have an adequate sewer system.

Thank you in advance for your attention to this plea.

Very sincerely,

Donald J. L. Coppedge
Executive Director

DJLC:cn
CC: Valley Forge Sewer Authority; Mr. Jerry Yentz, Chairman
Planning Committee; Mr. Charles Berger, Assistant Chairman
Planning Committee

"BEQUESTS TO THE 'Y' CHARITY FUND PERPETUATE YOUR INTEREST IN YOUTH"

(215) NI 4-2602

Council Chamber
BOROUGH of MALVERN
Malvern, Pa. 19355

PLANNING COMMISSION

July 26, 1973

Mr. Daniel J. Snyder III
Regional Administrator
Environmental Protection Agency
Region III
Curtis Building
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The Malvern Borough Planning Commission is concerned about the environmental impact of the proposed Valley Forge Sewer Authority system. We have not been approached or consulted in connection with the Impact Statement, and we feel we should have the opportunity to raise questions and provide input. I am writing to confirm the points I raised Wednesday in a telephone conversation with Mr. Donatoni of your office.

Malvern is a Chester County borough with small land area, located on the south ridge of the Great Valley. We depend for our municipal water supply on a system of wells and springs. Professional advisers have indicated the possibility of water table drop due to sewers removing water from our return cycle.

In pursuit of our functions we are concerned about this and other planning questions, and hope the Commission may meet with a member of the staff involved in preparation of the Impact Statement. Could you contact me to arrange such a meeting within the next three weeks? My telephone number is NI4-6224.

Following that meeting we will communicate our recommendations for the Impact Statement. Thank you for your cooperation.

Sincerely,

Thomas A. Randolph
Thomas A. Randolph
Chairman

cc: Mr. Steven A. Torok
Mr. Anthony J. Donatoni

RECEIVED
AUG 2 1973

APPENDIX 9

Industrial List

219

INDUSTRIES WITHIN DESIGN SERVICE AREA

Company	Location	Township or Borough	No. of Employees	Sewage Input
Matthey Bishop, Inc.	4 Malin Road	East Whiteland	311	
Accurate Tool Co.. Inc.	167 West King Street	Malvern	2	
Eagle Tool & Die Co.	Malvern Industrial Park		11	
Forge Millwork & Lumber Co.	183 Lincoln Highway	Malvern	20	
High Energy, Inc.	Malvern Industrial Park		19	
Hill Labs Co.	445 Lincoln Highway	Malvern	8	
Liquid Nitrogen Processing	412 King Street	Malvern	117	
Pa. Hardware Mfg. Co.	147 West Pennsylvania Ave.	Malvern	111	
Better Plastics Corp.	King & Bridge Streets	Malvern	100	
Pro-Tech, Inc.	Roberts Lane	Malvern	11	
Sterling-Fleischman, Inc.	176 Pennsylvania Ave.	Malvern	20	
Systematic Products, Inc.	3 Pennsylvania Ave.	Malvern	10	
Transwall Corp.	143 Pennsylvania Ave.	Malvern	12	
Tri-State Tubular Rivet	382 Lancaster Ave.	Malvern	13	
Wilson Equipment Co.	147 West King Street	Malvern	8	
Zeks Industries, Inc.	Malvern Industrial Park		100	
ATO Automatic Sprinkler Corp.	178 West Lancaster Ave.	Malvern	60	
Conwalt Corp.	55 Lincoln Highway	East Whiteland	68	
NRM Equipment Co.	Morehall Road	East Whiteland	31	
National Rolling Mills Co.	Morehall Road	East Whiteland	400	
Photolastic, Inc.	67 Lincoln Highway	East Whiteland	20	
Roll Form Products	Morehall Road	East Whiteland	46	
Rusticroft Fence Co.	449 East King Road	East Whiteland	20	
Vishay Intertechnology, Inc.	62 Lincoln Highway	East Whiteland	250	
Faith Publishing	732 Berwyn Ave.	Easttown	3	
Haines Gauge Co., Inc.	511 Old Lancaster Road	Easttown	6	
Micr-Metion, Inc.	10 Leopard Road	Easttown	15	
Tri-Metal Ladder Co.	626 Lincoln Highway	Easttown	8	
Valley Forge Tape & Label Co.	1018 West Lancaster Ave.	Easttown	15	

Industries Within Design Service Area (Cont.)

Company	Location	Township or Borough	No. of Employees	Sewage Input
A.S.H. Molded Products Co.	33 Sproul Road	East Whiteland	20	
Colt's, Inc. - Pyrodynamics Oper.	Box 874	East Whiteland	175	
Hoffman Iron Works	Box 865	East Whiteland	2	
Detwiler, F.H. & Sons, Inc.	P. O. Box 45	East Pikeland	16	
Miller, J. Ross & Sons	P. O. Box 111	East Pikeland	9	
Monsey Products Co.	P. O. Box 368	East Pikeland	35	
Pierce & Stevens Chemical Corp. (Division of Pratt & Lambert, Inc.)	Box 218, Coldstream Road	East Pikeland	20	
Roberts Packing Co.	Kimberton, Pa. 19442	East Pikeland	150	
Allen-Sherman-Hoff Pump Co.	P. O. Box 635	Tredyffrin	35	
American Solder & Flux Co., Inc. (Force Chemical Division)	Industrial Boulevard	Tredyffrin	19	
Betsy Ross Co.	Industrial Boulevard	Tredyffrin	75	
Burroughs Corp. (Defense, Space & Special Systems)	Group Central Ave.	Tredyffrin	2,800	
Deluxe Check Printers, Inc.	1 Industrial Boulevard	Tredyffrin	160	3,800 gpd
Gretz Machine Products	P. O. Box 174	Tredyffrin	10	
Greenleaf Mfg. Co.	Routes 30 and 401	Tredyffrin	8	
The Instructor Corp.	Paoli Industrial Park	Tredyffrin	175	
James Spring & Wire Co.	P. O. Box R	Tredyffrin	35	
Penflex - Pa. Flexible Metallic Tubing Co.	P. O. Box 415	Tredyffrin	85	
Paoli Publishing Co.	161 West Lancaster Ave.	Tredyffrin	8	
Pierce & Stevens Chemical Corp.	P. O. Box Y, Coldstream Road	Tredyffrin	24	
Waite Mfg. Corp.	215 Plank Ave.	Tredyffrin	9	
Wyeth Labs, Inc.	P. O. Box 861	Tredyffrin	206	
Bev. Maid, Inc.	P. O. Box 367	Schuylkill	12	
Maple Croft Farm Dairies	Box 7, Whitehorse Road	Schuylkill	5	
Force Chemicals Division	Industrial Boulevard	Willistown	19	600 gpd

SOURCE: Pennsylvania Industrial Directory

INDUSTRY WITHIN THE STUDY AREA, 1974[1]

Name	Municipality	Number of Employees	SIC Number[2]
Alexander, J. F. & Company, Inc.	East Whiteland	12	3589
Allen, C. Associates, Inc.	Malvern	6	2751
Allen-Sherman-Hoff Pump Company	Willistown	135	3561
American Lacquer Solvents Company	Schuylkill	120	2851
American Solder & Flux Company	Willistown	19	2899
Ametek, Inc.	Tredyffrin	49	3811
A M P Special Industries	Tredyffrin	174	3679
Anaconda American Brass	East Whiteland	20	3351
Ansul Company, The	Willistown	8	5099
Apex Manufacturing Company	East Whiteland	5	3949
Artmark Fabrics Company, Inc.	East Whiteland	80	2391
A-S-H Molded Products Company	East Whiteland	20	3069
Atlantic Plastics, Inc.	Malvern	30	3079
A T O Corporation	Malvern	60	3569
Automatic Sprinkler Corp. of America	Malvern	13	3569
Baltica Business Machines Corporation	Malvern	7	2761
Barbee's Printing	Willistown	2	2751
Bartholomew Company, The	West Pikeland	4	3429
Berger Acoustical Company, Inc.	Tredyffrin	100	1742
Betsy Ross Sales Company	Willistown	75	2071
Bishop Tube Company	East Whiteland	186	3312
Bryncoed Farms	West Pikeland	20	2026
Burroughs Corporation	Willistown	450	3573
Burroughs Corporation	East Whiteland	500	3573
Cam-Tronics, Inc.	Malvern	3	3643
Certain-Teed Products, Inc.	Schuylkill	500	2661
Chemical Coverings, Inc.	Malvern	5	3281
Colonial Printing	Malvern	2	2752
Colt Industries Operating Corporation	East Whiteland	55	3484
Conestoga Vineyards, Inc.	West Vincent	1	2084
Continental Can Company, Inc.	Tredyffrin	385	2643
Deluxe Check Printers, Inc.	Willistown	230	2751
Detwiler, F. H. & Sons, Inc.	East Pikeland	8	3446
Devault Manufacturing, Inc.	East Whiteland	5	3531
Devault Packing Company, Inc.	Charlestown	29	2011
Devault Stone Company	Charlestown	16	3281
Eagle Tool & Die Company	Malvern	10	3599
Engineered Specialty Products, Inc.	East Whiteland	14	3622
Extar Company	East Whiteland	1	2844
Fergusson, Alex C. Company	East Whiteland	65	2841
Fisher & Son Company, Inc.	Malvern	10	2042
Food Sales, Inc.	East Whiteland	22	5141
Foote Mineral Company	East Whiteland	89	3274
Forge Millwork & Lumber Company	Malvern	20	2431

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Name	Municipality	Number of Employees	SIC Number
GAF Corporation	East Whiteland	45	3579
Great Valley Industries, Inc.	Malvern	41	3643
Greenleaf Manufacturing Company	East Whiteland	8	3541
Haines Gauge Company, Inc.	Tredyffrin	6	3545
High Energy, Inc.	Malvern	41	3679
Highway Materials, Inc.	East Whiteland	5	2951
Hill Laboratories Company	Malvern	9	3841
Instructo Corporation, The	Tredyffrin	150	3911
James Spring & Wire Company	East Whiteland	46	3493
Jenkins Competition	Malvern	6	3711
Jessop Steel Company	East Whiteland	20	3441
Kendo Products, Inc.	Willistown	8	3469
Kurtz Brothers	Tredyffrin	28	5112
Lee Tire & Rubber Company	East Whiteland	87	3011
Liquid Nitrogen Processing Corp.	Malvern	110	2821
Loan Concrete Co., Inc.	East Whiteland	1	3273
L P B Inc.	East Whiteland	10	3662
Maplecroft Farm Dairies	Schuylkill	14	2026
Martin-Marietta Aggregates	East Whiteland	45	3281
Matthey Bishop, Inc.	East Whiteland	350	3499
Mega Products Corporation	Tredyffrin	5	3679
Micr-Mation, Inc.	Tredyffrin	32	3782
Miller, A. C. Concrete Products Co.	East Whiteland	25	3272
Miller, J. Ross & Sons	East Pikeland	14	3544
Mobane Corporation	East Pikeland	2	3554
Monsey Products Company	East Pikeland	40	2952
National Precision Casting Co., Inc.	East Whiteland	50	3369
National Rolling Mills	East Whiteland	600	3621
Norwood Industries, Inc.	East Whiteland	127	2295
Owens/Corning Fiberglas Corporation	Tredyffrin	37	3296
Pennsylvania Hardware Mfg. Company	Malvern	11	3861
Philadelphia Quartz Company	Schuylkill	250	3819
Photofabrication Chemical & Equipment Company	East Whiteland	3	2899
Photolastic, Inc.	East Whiteland	28	3821
Pierce & Stevens Chemical Corps.	East Pikeland	20	2851
Protect, Inc.	Malvern	15	3822
Quality Park Products Company	Tredyffrin	2	2642
Richardson Ink Company	Malvern	35	2893
Roberts Packing Company	East Pikeland	150	2011
Roll Form Products, Inc.	East Whiteland	46	3444
Rowland's Printing Co., Inc.	East Whiteland	7	2752
Rusticraft Fence Company, Inc.	Malvern	20	2499
Safety-Kleen Corporation	Malvern	8	2842
Springfield Supply Co., Inc.	Malvern	6	3444
Sterling Fleischman, Inc.	Malvern	20	3534
S-W Associates	East Whiteland	8	3221
S-W Associates	Willistown	9	3079
Systematic Products, Inc.	Malvern	10	3599

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Name	Municipality	Number of Employees	SIC Number[2]
Thermoset Extrusions, Inc.	Tredyffrin	4	3079
Tilo Company, Inc.	Malvern	26	3292
Transwall Corporation	Malvern	20	2542
Triangle Stamping Company	Malvern	4	3649
Tri-Metal Ladder Company	Easttown	8	3499
Tri-State Tubular Rivet	Malvern	35	3452
Ugite Gas Inc.	Malvern	48	5984
Union Paving Company	East Whiteland	6	2951
United Plastics Machinery, Inc.	East Whiteland	6	3079
Valley Forge Tape & Lable Company	Schuylkill	10	2752
Vishay Intertechnology, Inc.	Malvern	400	3649
Walldorph Industries	Malvern	13	3354
Warner Company	East Whiteland	76	3274
Warner Company	Tredyffrin	20	3272
Wayne Radionics, Inc.	East Whiteland	30	3662
Weaver, James A. Company	East Whiteland	-	5141
Weston & Stack, Inc.	East Whiteland	17	3811
Wyeth Laboratories, Inc.	East Whiteland	650	2834
Zeks Industries	Malvern	100	5141

1. Source: 1974 Chester County Industrial Directory

    1. Discrepancies may have occurred when the mailing address of an industry is in a municipality different than the actual location of the site.

    2. Standard Industrial Classification.

APPENDIX 10

INSTITUTIONAL EFFLUENT

INSTITUTIONAL EFFLUENT

NAME	SUB-DRAINAGE BASIN	GALLONS/ DAY	TYPE
Vincent	EV-1	4940	School (Public)
East Pikeland	EP-1	5296	"
Schuylkill	S-6	7030	"
High Street	S-5	8220	"
Charlestown	C-8	5170	"
Markley	EW-6	16240	"
Sugartown	W-3	5200	"
Malvern	M-2	2860	"
Green Tree	W-5	5200	"
Mateer	W-5	2440	"
Great Valley Sr.	EW-7	25675	"
Great Valley Jr.	W-5	12207	"
Paoli	T-10	6500	"
Hillside	T-11	9360	"
Berwyn	E-3	6800	"
Strafford	W-5	8066	"
Beaumont	E-5	4130	"
Valley Forge Jr.	T-9	17160	"
Conestoga Sr.	T-11	25714	"
Tredyffrin-East Jr.	T-14	20696	"
Phoenixville	C-1	30000	Nursing Home
Paoli General	T-4	24750	Hospital
Rush	W-4	10000	"
Kimberton Farms	EP-4	5044	Schools (Non-Public)
*St. Basil the Great	EP-8	1450	"
*Open Community	T-7	780	"
St. Patrick	M-1	2380	"
Villa Maria	W-2	6695	"
St. Norbert	T-10	2910	"
*Malvern Prep	M-2	5499	"
Tarleton	E-3	2700	"
Good Samaritan Episc.Day	T-10	1148	Nursery Play School
Maple Glen	T-11	238	"
*Malvern Play Group	M-2	231	"
*United Methodist	E-1	518	"
St. John's Weekday	S-6	154	"
TOTAL		293,407	

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*Within the Study Area but not sewered in 1st phase.

Source - Chester County Planning Commission

APPENDIX 11

SUBDIVISION DATA SHEET

PROPOSED SUB-DIVISION DATA SHEET
1969 - April 1973

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YEAR	SUB-DIV # AND TOTAL ACRES		< 2 ACRES #OF TRACTS	ACRES	> 2 ACRES < 5 ACRES #OF TRACTS	ACRES	> 5 ACRES #OF TRACTS	ACRES
1969								
	5	49.6			1	5.0	2	44.0
	11	129.5			53	147.0		
	15	109.3						
	21	44.0	44	44				
	22	44.3			10	44.3		
	23	40.3			16	40.3		
	30	82.5			13	82.5		
	44	84.3					3	84.3
	51	60.6					3	60.6
	52	104.0					13	104.0
	57	66.2			3	6.0	4	60.2
	64	29.1	36	29.7				
1970								
	69	36.0	1	6			2	35.5
	77	22.0			5	22.0		
	97	27.7	276 apts.	27.7				
	111	66.4	52	66.4				
	114	51.5			20	51.5		
	116	105.2			21	105.2		
	118	39.0			16	39.0		
1971								
	136	21.4			9	21.4		
	147	33.0					4	33.0
	151	28.7			1	2.3	1	26.4
	154	57.0			1	4.0	1	52.9
	160	20.0	11	20.0				
	163	47.6					2	47.6
	170	34.1			4	20.0	1	14.1

PROPOSED SUB-DIVISION DATA SHEET
1969 - April 1973

YEAR	SUB-DIV # AND	TOTAL ACRES	2 ACRES #OF TRACTS	ACRES	2 ACRES 5 ACRES #OF TRACTS	ACRES	5 ACRES #OF TRACTS	ACRES
1972								
	199	28.5			10	28.5		
	208	25.1			3	13.7	1	11.4
	235	300.0					1	9.1
	241	104.4	120	112.2				
	264	20.9	188	20.9				
	265	20.4					2	20.4
	268	78.2			1	3.0	2	75.2
	269	156.2					2	156.2
	272	53.0			12	33.0	2	20.0
	273	72.2	9	13.5	11	38.5	3	20.2
1973								
	287	20.0	24	20.0				
	296	70.0					2	30.7
	313	32.0					4	32.0

YEAR	< 2	> 2 < 5	> 5	TOTAL
1969	73.7	330.1	358.1	756.8
1970	94.7	217.7	35.5	347.9
1971	20.0	47.7	174.0	241.7
1972	146.6	116.2	312.5	575.3
1973	20.0	0	62.7	82.7
TOTAL	355.0	711.0	937.8	2004.4
%	17.7	35.5	46.8	

Source - Chester County Planning Commission - Subdivision Data Sheets

APPENDIX A

SUPPLEMENT TO SEWAGE FACILITY GRANT AGREEMENTS

The "Supplement to Sewage Facility Grant Agreement" represents an agreement in principle negotiated with the solicitors and supervisors of each municipality, but not yet formally executed. The ordinances attached as Exhibits "A" and "B" are drafts submitted by the municipalities and do not yet reflect comments prepared by EPA and DER.

7/25/74

SUPPLEMENT TO SEWAGE FACILITY GRANT AGREEMENTS

This Supplement to Sewage Facility Grant Agreements is entered into as of July 1, 1974 by the United States of America acting through the Environmental Protection Agency ("EPA") and the Townships of Charlestown, East Pikeland, Schuylkill, East Whiteland, Easttown, Tredyffrin and Willistown and the Borough of Malvern (the "Participants"), all being municipal governments within Chester County, Pennsylvania, and Easttown Municipal Authority, East Whiteland Municipal Authority, Malvern Municipal Authority, Tredyffrin Township Municipal Authority, Valley Forge Sewer Authority and Willistown Township Municipal Authority (the "Applicants"), all being municipal authorities created by one or more of the Participants, to supplement certain Grant Agreements and grant applications as hereinafter set forth.

BACKGROUND

a. In order to correct health hazards caused by malfunctioning on-site sewage treatment systems, the Applicants (except for Willistown Township Municipal Authority) applied in 1971 to EPA for grants for the planning and construction of interceptor sewers and regional secondary waste water treatment facilities (the "Plant") to serve the Participants.

b. On or about January 18, 1973, similar conditional Offers and Acceptances of grants were executed by each of said Applicants, containing General and Special Conditions, including Special Condition J, which made each grant conditional, inter alia, upon the implementation of such project changes and such environmentally protective measures, assurances and regulations as the Regional Administrator determined to be necessary after conducting a review of the project under the National Environmental Policy Act of 1969 ("NEPA"). In 1973 Willistown Township Municipal Authority applied for grants for its interceptors, and on or about July 25, 1973, a similar conditional Offer and Acceptance was executed by it.

c. In the above Special Condition J, (1) the term "measures" was defined to include the (a) identification of environmentally sensitive areas and (b) determination of projected growth and intensity of land use by sub-area within the sewer service area; (2) the term "assurances" was defined to include (a) binding assurance that no sewer service would be provided which would create environmentally adverse development pressure on environmentally sensitive areas and (b) agreement to provide sewer service to environmentally suitable areas; and (3) the term "regulations" was defined to mean the passage by appropriate organs of government of necessary environmentally protective regulations.

d. Following enactment of the Federal Water Pollution Control Act Amendments of 1972 ("FWPCA"), making certain sewage collection systems eligible for Federal grants, the Applicants applied for grants for collection systems to be constructed simultaneously with the Plant, and such applications are on the current priority list of the Pennsylvania Department of Environmental Resources ("DER"). The plant, interceptors and collection systems proposed to be constructed by the Applicants for the Participants are herein collectively sometimes called the "Facilities".

e. EPA and DER have determined, in the course of EPA's NEPA review of the Plant, that the Facilities have the potential to encourage increased real estate development in the area intended to be initially and ultimately served thereby (the "Service Area"), and that if by lack of adequate planning and land use controls, unsuitable development were permitted to occur on, or to adversely affect, environmentally sensitive areas, such as flood plains, wetlands, steep slopes and woodlands or to occur on unsuitable soil or sub-soil areas, it would compound and continue the hazardous health and water quality conditions which created the need for the Facilities and otherwise damage the environment

f. The Participants have adopted (1) sewage facilities plans, (2) zoning ordinances and (3) comprehensive land use plans (except for the Borough of Malvern which is currently preparing such a comprehensive land use plan) which help minimize the possibility of environmental damage. In addition, certain of the Participants have already adopted environmentally protective ordinances, as follows:

Easttown	-	Environmental provisions of subdivision and land development ordinance.
	-	Floodplain (Ordinance No. 116)
	-	Erosion and sedimentation control ordinance (in passage)
Tredyffrin	-	Historical Site Ordinance No. 206
	-	Flood plain provisions (Section 1616 of zoning ordinance)
East Whiteland	-	Establishment of flood hazard districts (Article IV of zoning ordinance)
East Pikeland	-	Flood plain provisions (Section 1311 of zoning ordinance)
Willistown	-	Flood plain restriction in zoning ordinance; amendment creating flood plain conservation districts (in passage)

And finally, certain of the Participants, including Charlestown, East Pikeland, East Whiteland and Willistown, are currently revising their existing comprehensive land use plans.

g. The Participants acknowledge that the Service Area contains numerous historic sites, many of which are protected by the National Historic Preservation Act. The Participants recognize (1) the need to protect flood plains, swamps, wetlands drainage ways, watercourses, open spaces and agricultural lands against environmental damage from unplanned or unsuitable development and that (2) a lack of proper natural resource management, including storm water management, could result in loss and damage to public and private improvements, destruction and unnecessary loss of historic and scenic sites, natural resources, loss of water retention facilities, open space and wildlife habitats, and impairment of water supplies and ambient air quality

h. The Participants desire to provide safe and sanitary drainage to protect surface and ground water supplies; reduce the danger of floods, overflow of water on lands, and rapid runoff of surface waters from developed areas; and permit and encourage land use compatible with the natural flow of water, the preservation of natural vegetation and marshes and the natural retention of storm water and other rapid water runoff.

i. East Whiteland, Malvern and Tredyffrin Townships are participating in the Federal Flood Insurance Program; East Pikeland, Easttown and Willistown are in the process of becoming participants; and Charlestown and Schuylkill have been preliminarily designated by the Commonwealth of Pennsylvania as containing "flood prone areas" and are therefore likely prospects for participation. In order to participate in said program, the Participants will have to comply with the Federal criteria for land management and use in flood-prone and mudslide-prone areas, contained in 24 Code of Federal Regulations, Chapter X, Part 1910, to the extent applicable.

j. The Participants recognize the need for additional protective measures in order to prevent damage from erosion and siltation arising from real estate development within the Service Area, said measures to be in addition to, but consistent with, the existing Regulations of DER under the Pennsylvania Clean Streams Law (35 P. S. Section 691.1 et seq.).

k. The Participants have been aware that certain soils and sub-soils within the Service Area have serious limitations for certain types of development, arising from susceptibility to frequent or continuous waterlogging; periodic surface inundation by storm water runoff; subsurface water pollution; erosion; slow internal water movement (permeability) depth to bedrock deposits; and high organic materials content. Accordingly, they desire that development of land shall occur only to a degree consistent with either the availability of sewers, or in the absence thereof consistent with the suitability of soil and sub-soil characteristics for on-site sewage disposal.

l. In order to minimize the possibility of environmental damage from environmentally unsound development stimulated by construction of the Facilities, the Participants are willing to review and consider revisions to their respective comprehensive land use plans (completing said plan, in the case of Malvern), and attempt to coordinate such plans with each other and with other published plans and programs of governmental agencies at the county, state and Federal level.

m. The Chester County Health Department has certain administrative and other duties under the provisions of the Pennsylvania Sewage Facilities Act (35 P.S. Section 750.1 et seq.) ("Act 537"), including the duty of issuing permits for construction of certain on-site sewage disposal systems. In addition, the County of Chester (the "County") prepared the official plan for community sewage systems in the County under the provisions of Act 537 ("Act 537 Plan"). The current Act 537 Plan includes the major portions of the Facilities.

n. The Participants also recognize the need, following the review and any revision of their comprehensive land use plans, to amend the Act 537 Plan to fully reflect any such revisions and the construction of the Facilities, and in all other respects comply with Act 537 as now in force.

o. All parties hereto desire that the Facilities, when completed, will not only eliminate health hazards and reduce surface and sub-surface water pollution, but that the possibility of secondary adverse impacts on environmental quality through environmentally unsuitable real estate development on environmentally sensitive areas be eliminated to the maximum possible extent. It is understood that this involves a balancing of environmental impacts with the environmental benefits expected to be achieved from the Facilities, as required by the provisions of NEPA. NEPA also states that its goals are to be achieved in cooperation with local governments.

p. The parties are also aware that construction of the Plant has been delayed for several reasons, including the time required to carry out the study of the Plant under NEPA, as a result of which inflation has increased the estimated project cost of the Plant. Also compliance by the Participants with their obligations hereunder will involve additional expense to them. Accordingly, EPA and DER have agreed to use their best efforts to fund the Participants' planning expenses incurred hereunder to the best of their legal and financial ability.

NOW, THEREFORE, the parties hereto, intending to be legally bound, hereby agree severally and not jointly, as follows:

1. Each Participant that has not already done so shall, on or before December 1, 1974, file an application with the Federal Insurance Administration for participation in the Federal Flood Insurance Program, and shall thereafter make all reasonable efforts to have such applications accepted as expeditiously as possible. In connection therewith, each Participant shall use its best efforts to comply with all applicable provisions of the regulations on Criteria For Land Management and Use adopted as part of said insurance program (Part 1910 of Title 24 C. F. R.).

2. As a continuation of prior environmental efforts, each Participant shall, on or before December 31, 1974, adopt and thereafter administer ordinances covering (a) erosion, sedimentation and storm water runoff control and (b) floodplain management. Such ordinances as initially adopted will be in substantially the form of Exhibits A and B attached hereto or such other form or forms as may be submitted by any Participant and approved by EPA and DER prior to adoption. Said Exhibits have been adapted from existing ordinances now in force or in passage before certain of the Participants, and EPA and DER hereby acknowledge the acceptability thereof for the purposes of this Agreement.

3. The parties acknowledge the primary jurisdiction of the Chester County Health Department in administering the provisions of Act 537 relating to permits for construction of certain on-site sewage disposal systems and the regulations thereunder as set forth in Chapters 71 and 73 of Title 25 of the Pennsylvania Code of Regulations, subject to the policies of DER. Jurisdiction for permit issuance having been vested in said Health Department, the Participants agree to cooperate with the Health Department in administering said Act and regulations. In addition, each Participant agrees not to issue a building permit for any site within its boundaries, unless (a) the type and extent of development contemplated by the building permit application is consistent with the Participant's comprehensive land use plan as implemented through its zoning ordinances, and (b) either (1) public sewers are available (or a permit for their construction has been issued by DER, in which case no occupancy permit shall be issued until public sewers are available), or (2) the County Health Department has issued a permit for on-site sewage disposal for the type and extent of development contemplated by the building permit application (or no such permit is required under applicable law).

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4. In order to fully ensure that future development of the Participants will be consistent with the goals of NEPA, the Pennsylvania Municipalities Planning Code, the Pennsylvania Sewage Facilities Act and other applicable law, each Participant agrees to promptly undertake, or complete as applicable, a review

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of its existing comprehensive land use plan and to incorporate therein all changes which it determines, after the coordination referred to in Section 5 below and full public participation, to be advisable in the light of the abovementioned goals, the recommendations made by EPA in its Final Environmental Impact Statement and all changed circumstances since the preparation or last previous revision of said plan, with particular attention given to the anticipated impact of construction of the Facilities. Participants will use their best efforts to develop comprehensive land use plans responsive to local and regional needs and desires and protective of all existing environmental values, to the maximum extent determined to be feasible by each Participant. Copies of all reviews and any proposed revisions will be submitted to EPA and DER after the coordination referred to in Section 5 below but prior to the requisite public hearings thereon, and all comments received from said agencies, as well as comments received from other agencies, groups and individuals at said public hearings, will be considered by Participants in exercising their respective governmental responsibilities under the applicable law. It is understood that the extent of required revision of the various comprehensive land use plans may vary widely among the Participants, because certain of the plans are of recent date and have progressed further than others.

5. In order to coordinate the activities set forth in Section 4 above to the maximum feasible extent, the Participants agree to participate, through a planning coordination group, which will consist of one or more representatives from each Participant and the Chester County Planning Commission (such as the Eastern Chester County Regional Planning Council - Group 2), in the coordination of each Participant's comprehensive land use plan, and the Participants will give consideration to the comments and suggestions of such group relative to the coordination of adequate control strategies for the protection and preservation of natural resources and environmental values.

6. Promptly following the review and the adoption of any abovementioned revisions to its comprehensive land use plan, each Participant will adopt and thereafter administer such additional ordinances and policies as it determines to be necessary or appropriate, in order to effectuate and implement the plan, after giving consideration to the comments of EPA and DER on such plan.

7. (a) Promptly following the review and the adoption of any abovementioned revisions to its comprehensive land use plan, each Participant will prepare a revision to its local sewer plan, which shall be consistent with its comprehensive land use plan, as required by Act 537. Each such revision shall then be submitted to the Chester County Planning Commission for its review as to consistency with the comprehensive land use plan for such Participant, as required by Act 537. Following such reviews, each Act 537 Plan revision, together with the reviews as to consistency, shall then be submitted to DER for its approval, as required by Act 537.

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(b) Each local sewer plan (1) shall set forth particularly which areas are proposed to be served within the next 10 years and which are not, as required by Act 537; (2) shall provide generally for installation of public sewers as needed to implement the Participant's comprehensive land use plan and shall be consistent with said plan; and (3) shall provide generally for the following time priorities in constructing substantial extensions of public sewers, to serve new areas;

First:	developed areas with septic problems causing health hazards or other environmental problems, subject to economic feasibility.
Second:	developed areas where development has occurred on land not suitable for on-site systems, even though actual problems may not yet have occurred and subject to economic feasibility.
Third:	undeveloped areas where land is suitable for development under the applicable comprehensive land use plan, but in which on-site systems would be environmentally unsound.
Fourth:	other undeveloped areas, subject to the next succeeding paragraph.

(c) The local sewer plans shall also designate those undeveloped areas not to be sewered (except as hereinafter provided), because as shown on or described in the related comprehensive land use plan they are within flood plains, are otherwise environmentally unsuitable for development or certain kinds of development, as the case may be, or are designated for low density development, agricultural use or open space. Such areas will not be sewered until the applicable Participant shall have (1) amended its comprehensive land use plan with respect to the area and (2) revised its local sewer plan and such revision has been approved by DER

(d) Where a particular sewer extension abuts or passes through several areas having different priorities, the project may nevertheless be constructed so long as connections of new developments are prohibited in those areas referred to in subparagraph (c) above and it is consistent with the approved Act 537 Plan.

8. It is recognized that the abovementioned planning will require the availability of adequate financial support, and accordingly EPA will use its best efforts to obtain a determination that the cost of such planning or a portion thereof is an "eligible cost" of the Facilities within the grant provisions of the FWPCA and regulations thereunder

It is understood that although the obligations of the Participants to review and where necessary revise their comprehensive land use plans shall not be dependent upon the eligibility of the costs as mentioned above their respective obligations to prepare local sewer plans for revision of the Act 537 Plan are contingent upon the availability under Act 537 of grants from Pennsylvania for at least one-half of the "eligible costs" of developing such plans.

9. In order to ensure the completion of the planning processes contemplated herein, and in accordance with 40 C.F.R. Section 30.602-1, EPA's sole remedy for the Participant's failure to complete such process shall be to withhold an amount not to exceed 10% of its grant funds for the Facilities from any Participant which has not fulfilled its obligations described in Sections 1 through 7 hereof by the time payment of such portion would otherwise be payable under applicable grant regulations; provided that because the Plant is to be jointly used by all Participants, the abovementioned withholding of grant funds with respect to the Plant will be limited to that portion thereof as shall be equal to the proportional reserve capacity in the Plant set forth in the Valley Forge Treatment Plant Agreement for any Participant which hasn't fulfilled such of its obligations, and provided further that because Valley Forge Sewer Authority has

made application for a single grant in behalf of Schuylkill, Charlestown and East Pikeland Townships for their respective share of the Plant and their respective collection system, in the event any of said townships has not fulfilled said obligations by such time, EPA may withhold only said percentage of the portion of the grants to the Valley Forge Sewer Authority as is applicable to such township. Any withheld funds will be paid promptly when the above described obligations have been fulfilled.

10. The obligations of the Participants herein are intended to supersede Special Condition J in the existing Grant Agreements, and will be deemed to eliminate the need for any similar special land use conditions other than those contained herein in the award of grants on the pending applications for collection systems for the Participants, provided such award takes place by January 1, 1976. EPA will give prompt consideration to said applications if and when they are certified for funding by DER.

23%

11. EPA also agrees that the funding level under the existing Grant Agreements will be increased to 75% of the actual "eligible costs", thus covering cost-inflation since the date the existing grants were awarded, all subject to the availability of Federal funds and approval by DER.

12. Notwithstanding any other provision hereof, the Participants may, but shall not be required to, apply or extend the limitations and requirements contained in Sections 3, 4, 5 and 7 of this Agreement to those portions of their areas which are outside the boundaries of the Service Area.

13. If any litigation is commenced against any Participant challenging its entry into this Agreement or any of the actions taken by it hereunder or consistent herewith, such Participant will use its best efforts in defense thereof (which shall not require an appeal from judgments of courts of common pleas), and EPA and DER will actively cooperate therein. Upon any final judgment this Agreement shall be deemed to be amended in accordance therewith. The invalidity of any provisions hereof shall not be deemed to affect any other provision hereof, it being the intention that this Agreement would have been entered into without including the provisions held to be invalid.

14. This Agreement shall be executed in several counterparts so that there will be one fully executed counterpart for each Participant, each Applicant and EPA. It will become legally binding only when executed by all parties hereto, and thereafter shall bind the parties severally and not jointly.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their respective duly authorized officers, as of the day and year first set forth above.

UNITED STATES OF AMERICA
Acting through the ENVIRONMENTAL PROTECTION
AGENCY

By____________________________
Regional Administrator

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(SEAL)

TOWNSHIP OF CHARLESTOWN

ATTEST:

By____________________________
Chairman, Board of Supervisors

By____________________________
Secretary

(SEAL) TOWNSHIP OF EAST PIKELAND

ATTEST:

By______________________ By______________________
Secretary Chairman, Board of Supervisors

(SEAL) TOWNSHIP OF SCHUYLKILL

ATTEST:

By______________________ By______________________
Secretary Chairman, Board of Supervisors

(SEAL) TOWNSHIP OF EAST WHITELAND

ATTEST:

By______________________ By______________________
Secretary Chairman, Board of Supervisors

(SEAL) TOWNSHIP OF EASTTOWN

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ATTEST:

By______________________ By______________________
Secretary Chairman, Board of Supervisors

(SEAL) TOWNSHIP OF TREDYFFRIN

ATTEST:

By______________________ By______________________
Secretary Chairman, Board of Supervisors

(SEAL) TOWNSHIP OF WILLISTOWN

ATTEST:

By______________________ By______________________
Secretary Chairman, Board of Supervisors

(SEAL) BOROUGH OF MALVERN

ATTEST:

By______________________ By______________________
Secretary President, Borough Council

(SEAL)

EASTTOWN MUNICIPAL AUTHORITY

ATTEST:

By____________________
Secretary

By____________________
Chairman

(SEAL)

EAST WHITELAND MUNICIPAL AUTHORITY

ATTEST:

By____________________
Secretary

By____________________
Chairman

(SEAL)

MALVERN MUNICIPAL AUTHORITY

ATTEST:

By____________________
Secretary

By____________________
Chairman

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(SEAL)

TREDYFFRIN TOWNSHIP MUNICIPAL AUTHORITY

ATTEST:

By____________________
Secretary

By____________________
Chairman

(SEAL)

VALLEY FORGE SEWER AUTHORITY

ATTEST:

By____________________
Secretary

By____________________
Chairman

(SEAL)

WILLISTOWN TOWNSHIP MUNICIPAL AUTHORITY

ATTEST:

By____________________
Secretary

By____________________
Chairman

APPENDIX B

Comments Received on the Draft EIS
by
Federal Agencies
State Agencies
Local Agencies
Environmental Groups
Public

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
TELEPHONE (215) 352-5800

8400
December 27, 1973

Daniel J. Snyder, III
Regional Administrator
U.S. Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Dan:

Reference is made to your circular of December 7 transmitting a Draft Environmental Impact Statement for Valley Forge Area Wastewater Treatment Facility, Chester County, Pennsylvania, for review and comment.

243 The interest of the Forest Service centers in two aspects of the proposal: the impact which the construction of sewage lines will have on forested or wooded areas, and the possibility of spraying treated effluent on such areas.

We know that all parties concerned share the former of these interests with us, and the references under Description of the Proposed Wastewater Treatment Facility, and Adverse Primary Impacts Which Cannot Be Avoided give us assurance that such impacts will be kept to the minimum possible. While it might result in some repetition, it would appear appropriate that the Final statement also recognize this impact in section IV C Environmental Impact of the Proposed Action - Impacts on Aesthetics.

Under III., Alternatives, D. Structural Alternatives, there is a section headed Evaluations. The "evaluation" of the third alternative presents two reports on spraying of effluent on land, one by Buchart-Horn, and one by Mr. Marshall Haws. The two reports do not appear to us to be very consonant, and do not appear to have been evaluated. For example, there is no indication whether Valley Forge Park is, in fact, available for effluent disposal, and it would seem that the answer to this question could very easily be determined.

We appreciate the opportunity to review and comment on the draft.

Sincerely,

ROBERT D. RAISCH
Director

OFC REG ADMIN
DEC 73 11: 12

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Box 985 Federal Square Station, Harrisburg Pennsylvania 17108

January 10, 1974

Mr. Daniel J. Snyder, III
Regional Administrator
Region III
U. S. Environmental Protection Agency
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The Draft Environmental Impact Statement for Valley Forge Area Wastewater Treatment Project (3-OGC-IS-P-2) in Chester County, Pennsylvania, that was addressed to the U. S. Department of Agriculture on December 7, 1973, was referred to the Soil Conservation Service for review and comment.

We have no constructive comments to offer on this Draft Environmental Impact Statement.

We appreciate the opportunity to review this proposed project.

Sincerely,

Benny Martin Acting
State Conservationist

OFFICE OF THE ASSISTANT SECRETARY OF COMMERCE
Washington, D.C. 20230

RECEIVED
JAN 25 1974

[illegible]

January 21, 1974

Mr. Daniel J. Snyder, III
Regional Administrator
Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The draft environmental impact statement for Valley Forge Area Wastewater Treatment Facility, Chester County, Pennsylvania, which accompanied your memorandum of December 7, 1973, has been received by the Department of Commerce for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

240 III. Alternatives

We suggest that ozonation be discussed as an alternative to disinfection of the treatment plant effluent by chlorination.

IV. Proposed Project - C. Environmental Impact of the Proposed Action

P. 204: The statements in paragraph 3 concerning ammonia nitrogen, nitrates/nitrites, phosphates, and eutrophication should be clarified. These statements imply that converting ammonia nitrogen to nitrates/nitrites will reduce eutrophication even though phosphates are not limited. Whereas ammonia is toxic, nitrates/nitrites provide a nitrogen source that is readily utilized by plants. Excesses of nitrates typically lead to noxious algal blooms, especially if there is an adequate phosphate source.

IV. Proposed Project - D. Adverse Impacts Which Cannot be Avoided

P. 257: Precautionary measures are described to minimize sedimentation resulting from construction of the treatment facility. It may be beneficial to include a schedule of the proposed construction activities because proper timing of these activities could help minimize inimical environmental effects on aquatic biota. For example, it is stated in the draft environmental impact statement (p. 50) that the majority of fish in the area are spring and summer spawners, and (p. 218) that species diversity is highest in mid-summer, probably because the young of many species have entered the community. Juvenile and young-of-the-year fish are typically more susceptible to the lethal effects of suspended solids than adults of the same species.[1] Thus, some modification of the construction schedule may be desirable, and we suggest that several options be discussed in the final environmental impact statement.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving a copy of the final statement.

Sincerely,

246

Sidney R Galler

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

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[1] Sherk, J.A., J. M. O'Connor, and D. A. Neumann. 1972. Effects of suspended and deposited sediments on estuarine organisms. Phase II. Annual Report - Project year II, 17 September 1971 - 17 September 1972. University of Maryland. Natural Resources Institute, Department of Environmental Research, Chesapeake Biological Laboratory, Prince Frederick, Maryland. Ref. No. 72-9E, 106 pages.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
PHILADELPHIA AREA OFFICE
CURTIS BUILDING, 625 WALNUT STREET
PHILADELPHIA, PENNSYLVANIA 19106

REGION III
Curtis Building
6th. and Walnut Streets
Philadelphia, Pennsylvania 19106

JAN 24 1974

IN REPLY REFER TO:
3.4PPC
File: Env.
Other Agencies
EIS

Mr. Daniel J. Snyder, III
Regional Administrator
United States Environmental
Protection Agency, Region III
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

Subject: HUD Philadelphia Area Office Review of the Draft Environmental Impact Statement (EIS) on the Valley Forge Area Wastewater Treatment Project

We have reviewed the subject draft EIS and, in general, consider it to be a comprehensive statement of relevant issues pertaining to the project. We do note, however, that the draft EIS does not explicitly respond to some of the key issues raised. In particular,

p17

A. Issues raised by Montgomery County (pp 199-200) concerning the project's inconsistency" with overall water quality management and good regional planning,"

B. Issues raised by the Phoenixville Area Retailers Association (pg. 200) concerning the degree to which Chester County and Chester County municipalities are committed to the Philadelphia Metropolitan Area's "Regional Land Use Plan,"

C. Issues raised in the context of the discussion of the "Chesterbrook" housing development (pp 253-254), such as those raised by the Chesterbrook Conservancy concerning preservation of historic sites and protecting the State Park from existing and anticipated future development pressure which might result if the Wastewater Treatment system is built as proposed.

Further, EPA has not made explicit the specific kinds of assurances, regarding strict adherence to proper areawide and local land use planning and zoning controls that the Agency will require before allowing the project to be implemented.

OFC REG ADMIN

25 JAN 74 11:36

We believe that the above cited issues should, as feasible, be more fully resolved within the framework of the finalized EIS.

We note that the "due date" for comments was January 18, 1974, and hope that our response at this date does not provide you with any inconvenience.

Should you have any questions concerning our comments, please do not hesitate to contact Mr. William Skwersky of our staff at (215) 597-2605.

Sincerely,

James R. Treadwell

James R. Treadwell, Jr.
Environmental Clearance Officer

cc:
T. Atkeson, General Counsel, CEQ, Washington,D.C. G (10 copies)
Assistant Secretary for CPM & CD
Attention: Environmental Clearance Officer M

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-73/1574

DEC 18 1973

Dear Mr. Snyder:

This is in regard to your letter of December 7, 1973, requesting the Department of the Interior's review and comments on the draft environmental statement for the Valley Forge Area Wastewater Treatment Facility, Chester County, Pennsylvania.

The Department will have comments on the draft statement but will be unable to reply within the time frame you requested as we just received (December 13, 1973) your transmittal. Therefore, our comments should be available by early February 1974. 19

Sincerely yours,

Bruce Blanchard
b
Bruce Blanchard, Director
Environmental Project Review

Mr. Daniel J. Snyder, III
Regional Administrator
Environmental Protection Agency
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

258<

JOHNNY HORIZON 76

ADMIN 17

Let's Clean Up America For Our 200th Birthday

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer To:
EGS
ER-73/1574

FEB 15 1974

Dear Mr. Snyder:

This Department has received and reviewed the draft environmental statement for the Valley Forge Area Wastewater Treatment Facility, Chester County, Pennsylvania, as requested in your letter of December 7, 1973.

Historic and Archeologic Considerations

While historical and archeological values affected by the proposed action, including Valley Forge State Park, are recognized and described, and the Advisory Council on Historic Preservation and the State Historic Preservation Officer have been consulted concerning the Wilson Road pump station, the draft statement does not indicate full compliance with the Historic Preservation Act of 1967 and the compliance procedures developed pursuant thereto. The project sponsor should apply the Criteria for Effect developed by the Advisory Council on Historic Preservation to the entire project, not just the Wilson Road pump station. Finding an effect, the project sponsor should consult the Advisory Council and the State Historic Preservation Officer. Evidence of such consultation, including a memorandum of agreement executed by the Council, State Historic Preservation Officer, and project sponsor should appear in the final statement. 25c

Recreation Considerations

The draft statement indicates that the Valley Forge State Park Commission is withholding any endorsement of the proposed project pending their review of this document. The statement includes provisions for protection of archeological resources, rehabilitation of the landscape, and special architectural design features for the Wilson pumping station. The final statement should include evidence that the Park Commission is in agreement with the adequacy of these protective provisions.

Plate 13 indicates that much existing land in the Valley Creek and French Creek flood plain areas within the Potentially Servicable Area is woodland, pastures, or meadows. The Composite Land Use Plan, Plate 19, indicates a desire to preserve these flood plain areas as "Flood Plain and Private Recreation." We question the adjective "private," since

Valley Forge State Park is included in this classification; perhaps both "private and public" recreation was intended, but this matter should be clarified in the final statement.

With reference to the discussion on page 241 of the draft statement, we suggest that development of such a stream valley network does not necessarily need to await development by following "current practice." We suggest the possibility of beginning to develop a stream valley network in conjunction with the construction of the treatment plant. Rights-of-way for sewer lines along Valley and French Creeks might be extended to include conservation easements where feasible, and acquisition elsewhere. While strong flood plain zoning may protect the immediate stream valleys from development, it does not provide for public access to and enjoyment of the streams. Because this area is beginning to feel development pressure, we believe that now is an appropriate time to consider preservation of this resource for public use. The opportunities presented range from a stream side trail with fishing and passive recreation opportunities, to a more elaborate stream valley park. Integration with any open space dedication in the "Chesterbrook Tract," should that development take place, is also a possibility.

251 Due to this Department's interest in the recreational opportunities presented by the proposed project, we urge future coordination between this Department, the Environmental Protection Agency, and State and local planning and recreation agencies. The Regional Director, Northeast Region, Bureau of Outdoor Recreation, Philadelphia (telephone: (215) 597-7989) will be responsible for coordination of that Bureau's interests. The Regional Director would be willing to meet with representatives of the aforementioned agencies and review and comment on any subsequent material which may be prepared on the subject project.

Fish and Wildlife Considerations

We feel that some additional information should be provided relating to fish and wildlife resources. Specific comments include the following.

Page 48: The word "ripples" should be changed to "riffles" in the first sentence of the second paragraph.

Page 49: The list of macro-invertebrates (Appendix 3, Exhibits 1 and 2) referred to here would be far more useful if the fauna of the Schuylkill River and Perkiomen, Little Valley, Darby, Little Darby, and Trout Creeks were presented separately, rather than in an amalgamated list. In addition, a brief verbal description of the macro-invertebrate information, indicating which species are dominant and how this relates to water quality in each of the streams, should be provided.

Page 50, terrestrial biota: An estimation of the population density of the various birds and mammals listed and an indication of their importance as game species would make this section more meaningful.

Page 52: An estimation of the percentage of land in a potentially serviceable area occupied by each of the listed vegetation types should be provided along with a description of the importance of each type as wildlife habitat.

Page 60: It is unclear as to what the words "the proceeding paragraph" refer. A verbal description or chart including percentage of land occupied by the various land uses shown on plate 13 would make this paragraph more informative.

Another section entitled "Recreational Uses" should be included under the "Land Use" heading. This section would provide information on fishing pressure, hunting, boating, sightseeing, etc., in a potentially serviceable area.

Page 205: The draft here indicates the proposed facilities will upgrade water quality of the Schuylkill River. This appears to contradict the last sentence of paragraph 2, page 204. It is not clear whether the overall BOD reaching the Schuylkill will be reduced or increased by construction of the Valley Forge plant. 252

Page 220: Wildlife may not be able simply to relocate as adjacent land already supports wildlife populations. Rather, wildlife populations may well be reduced due to the decrease in habitat available.

Sincerely yours,

Actin
Deputy Assistant Secretary of the Interior

Mr. Daniel J. Snyder, III
Regional Administrator
Environmental Protection Agency
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

OFFICE OF
EXECUTIVE DIRECTOR
TELEPHONE
AREA CODE 717 - 787-3633

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
P. O. BOX 1567
HARRISBURG, PA. 17120

ADMINISTRATIVE DIVISIONS:

ACCOUNTING	787-4492
ADMINISTRATION	787-5670
LICENSE SECTION	787-2084
PERSONNEL	787-7836
INFORMATION & EDUCATION	787-6286
LAW ENFORCEMENT	787-5743
LAND MANAGEMENT	787-6818
REAL ESTATE	787-6568
PROPAGATION	787-6711
RESEARCH	787-5529

January 8, 1974

Mr. Daniel J. Snyder, III
Regional Administrator
U. S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

RECEIVED:
JAN 15 1974
EPA, DAWP, R3
Environmental Planning and
Standards Branch

Dear Mr. Snyder:

We have reviewed the Environmental Impact Statement for the Valley Forge Area Wastewater Treatment Facility.

The extreme northern service area will include a small section of our Farm-Game Cooperative Project No. 71. These cooperative projects with landowners make available hunting acreage for small game. As sewer mains are extended, no doubt portions of the land within our project area would be lost to developers.

Please include red squirrel and wood duck as game species on Exhibits 4 and 5, Appendix 3. We have no other comments.

Very truly yours,

Glenn L. Bowers

Glenn L. Bowers
Executive Director

OA-501 12-67

COMMONWEALTH OF PENNSYLVANIA

January 21, 1974

SUBJECT: Valley Forge Area Wastewater
Treatment Project (3-OGC-IS-P-2)

TO: Daniel J. Snyder, III
Regional Administrator
U. S. Environmental Protection Agency

FROM: Jack G. Miller, Chief
Fisheries Environmental Services
Pennsylvania Fish Commission

The Pennsylvania Fish Commission recognizes the need for collection and treatment of wastewater, especially in such areas of high population density. However, we do not feel that the streams of the area should be the route for the sewer lines.

All sewer lines should avoid contact with the stream except where a crossing is necessary for a connection to a collection system. All other lines should be kept at least 25 feet from the streambank.

For these reasons, Alternate "C" in Appendix 4 is much more desirable from the standpoint of protection of the aquatic environment than either Alternate "A" or "B".

The treatment plant should provide sufficient treatment so that the Schuylkill River is not subjected to effluent which will be beyond the river's ability to assimilate. The river is already receiving too much enrichment and other forms of pollution and cannot handle any additional load.

JGM:dms

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

December 7, 1973

RECEIVED
DEC 12 1973
FHA State Office
Harrisburg, Pa.

SUBJECT: Valley Forge Area Wastewater Treatment Project
(3-OGC-IS-P-2)

In accordance with the National Environmental Policy Act of 1969 (P.L. 91-190), submitted herewith for your information and consideration is a Draft Environmental Impact Statement in conjunction with plans to construct a sanitary sewerage collection and treatment system to serve the municipalities of Schuylkill, Charlestown, East Pikeland, Tredyffrin, Easttown, East Whiteland and Willistown Townships, and Malvern Borough.

We would appreciate receiving your comments within 45 calendar days from the date of this transmittal.

Sincerely yours,

for
Daniel J. Snyder, III
Regional Administrator

255

Enclosure

First Endorsement: December 21, 1973

TO: US-EPA, 6th & Walnut Streets, Philadelphia, PA. 19106

Thank you for the opportunity to review the Environmental Impact Statement for the above named project. We have no comments to make relative to the impact Statement.

Penrose Hallowell

PENROSE HALLOWELL
State Director

DELAWARE RIVER BASIN COMMISSION
P. O. BOX 360
TRENTON, NEW JERSEY 08603
(609) 883-9500

OCTOBER 27, 1961

JAMES F. WRIGHT
EXECUTIVE DIRECTOR

HEADQUARTERS LOCATION
25 STATE POLICE DRIVE
WEST TRENTON, N. J.

January 17, 1974

Daniel J. Snyder, III
Regional Administrator
United States Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

RE: Draft Environmental Impact Statement,
Valley Forge Area Wastewater
Treatment Project
(3-OGC-IS-P-2)

Dear Mr. Snyder:

The Valley Forge Area Wastewater Treatment Project has been reviewed pursuant to Section 3.8 of the Delaware River Basin Compact and found not to conflict with nor adversely affect the Comprehensive Plan of the Delaware River Basin Commission. This project (D-71-117-CP) was added to the Comprehensive Plan as of July 28, 1971.

The draft environmental impact statement has been reviewed and found to be a comprehensive discussion of this project. The environmental benefits which will accrue from development of the proposed wastewater treatment system are well documented, and the need for the facility is adequately demonstrated.

It would be advantageous for evaluation of the impact to inland streams (pages 209-216) if additional information and analysis were presented on other discharges into the Schuylkill River, in addition to the proposed Limerick generating station, so that the accumulative effect to the river from all wastewater effluents could be determined. Such information could supplement that provided in Plate 4, and indicate this project's contribution to adverse impacts caused by wastewater discharges into the Schuylkill River watershed from Chester County and Montgomery County facilities. An evaluation of cumulative impacts to dissolved oxygen concentrations in the receiving water would be of value, and your attention is directed to a report on the Schuylkill River by Iraj Zandi of the University of Pennsylvania, March, 1971.

The discussion of this project's potential impact to land use planning activities in the service area, as well as analysis of potential impacts to water resources by increasing development, is a valuable inclusion in the impact statement. It would be of interest, however, to further examine the areas where this project will promote undesirable development and indicate those impacts to water resources which may result. For instance, elaboration of the effects from development along Little Valley and French Creeks, as noted on page 265, could further alert local government agencies to the adverse impacts which could be incurred if the proposed project is permitted to create development in areas more suited to other uses.

The Delaware River Basin Commission appreciates the opportunity to review and comment on this impact statement.

Sincerely,

James F. Wright

GOVERNOR'S OFFICE
OFFICE OF STATE PLANNING AND DEVELOPMENT
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG, PA. 17120

January 2, 1974

Mr. Daniel J. Snyder, III
Regional Administrator
Region III
Environmental Protection Agency
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

Please be advised that the Commonwealth of Pennsylvania is presently reviewing the Draft Environmental Impact Statement for the Valley Forge Area Wastewater Treatment Project - (3-OGC-IS-P-2).

255

We understand the Department of Environmental Resources wishes to comment on the Statement and has only recently received sufficient copies to achieve a thorough review by all affected review bureaus.

We shall transmit the comments of the Department - which will reflect the comments of the Commonwealth-when they are received in our Office.

Sincerely,

Richard A Heiss

Richard A. Heiss, Coordinator
Pennsylvania State Clearinghouse

7 JAN 74 2: 09

RAH/rew

COMMONWEALTH OF PENNSYLVANIA
GOVERNOR'S OFFICE
OFFICE OF THE BUDGET
HARRISBURG, PA. 17120
P.O. Box 1323

ENVIRONMENTAL IMPACT REVIEW
PENNSYLVANIA STATE CLEARINGHOUSE
Phone: 717-787-8046

February 22, 1974

Title: Valley Forge Area Wastewater Treatment Facility

Location: Chester County

Applicant: U.S. Environmental Protection Agency

PSCH project number: 73-12-3-002

Mr. Daniel J. Snyder, III
Regional Administrator
U.S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

257

The Governor's Budget Office, as the State Clearinghouse for the Commonwealth of Pennsylvania, has received and transmitted to various State agencies, including the Department of Environmental Resources, copies of the environmental statement mentioned above.

Attached to this letter please find the comments of the Department of Environmental Resources and the following State agencies:

Please consider these the official response of the Commonwealth in this matter.

Sincerely,

R.A.Heiss

Richard A. Heiss, Coordinator
Pennsylvania State Clearinghouse

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES
P. O. BOX 1467
HARRISBURG, PENNSYLVANIA 17120

February 11, 1974

SUBJECT: Department of Environmental Resources
Review and Evaluation of
PSCH No.: 73-12-3-002

TITLE: DEIS - Valley Forge Area
Wastewater Treatment Facility

LOCATION: CHESTER COUNTY

TO: R. A. Heiss, Coordinator
Pennsylvania State Clearinghouse

Maurice K Goddard

FROM: MAURICE K. GODDARD
Secretary of Environmental Resources

Submitted Draft Environmental Impact Statement for the proposed project is granted clearance on condition that the requirements mentioned in this Project Review and Evaluation Report are met.

This project has been evaluated on the basis of the actions proposed in the applicant's submission. Any approval, granted or implied, does not extend to any changes made by the applicant subsequent to and not in keeping with our recommendations. Any such changes will require a new submission through the Pennsylvania State Clearinghouse.

DEPARTMENT OF ENVIRONMENTAL RESOURCES
SUMMARY OF REVIEW AND EVALUATION

PSCH No.: 73-12-3-002

TITLE: DEIS - Valley Forge Area
Wastewater Treatment Program

DATE: February 11, 1974

LOCATION: CHESTER COUNTY

This project proposed the construction of public sewerage facilities which are necessary to eliminate malfunctioning on-lot sewage systems that are potential health hazards and pollute the waters of the Commonwealth. The construction of the sewerage facilities is needed to eliminate existing inadequate interim treatment facilities. This project is consistent with the Chester County sewerage facilities plan and their construction permit has already been issued by the Bureau of Water Quality Management The need for the sewage system in this area has been well documented by the county sewerage facilities plan and the Chester County Health Department. The validity of the existing zoning and land use control measures in the area should not be affected by the proposed project. However, the need for controlled good land use planning and zoning is mandatory. The municipalities involved in this project have an obligation under the Sewage Facilities Act and the Clean Streams Law to plan for and provide adequate sewerage facilities for the existing population and future development.

The construction and operation of this project would eliminate the following interim treatment facilities which have been issued violation notices:

C. N. Agnew
Paoli Industrial Park
Boroughs Corporation
James Overstreit
Warner Company (Malvern)
Great Valley Meat Market
Valley Forge Sewage Authority Interim Plant
Richardson Ink.
National Rolling Mills
Bishop Tube
Roberts Packing Company

The project would, therefore, provide a means of abatement of the problems reflected by the violation notices and orders. This project is required to obtain and function under the following permits: Air Quality, Sewerage, Erosion Control, and Dams and Encroachments. It also must have an Erosion Control Plan and comply with the Occupational Health and Solid Waste Management regulations.

A public hearing was held by the U.S. Environmental Protection Agency on January 10, 1974. The following statement was made by a representative of our Department:

> "The Department endorses the subject project as the construction of public sewerage facilities is necessary to eliminate malfunctioning on-lot sewage systems that are potential health hazards and pollution of the waters of the Commonwealth. The construction of sewage facilities is needed to provide sewer service to future areas of development and to eliminate existing interim treatment facilities.
>
> The Department shares the concerns set forth in the EIS that future development,

to be serviced by the proposed facilities, will not have an adverse effect upon the environment and social amentities. The Clean Streams Law (Act 222) and the Sewage Facilities Act (Act 537) provide for the Department to regulate the approval by permits for extensions of public sewer systems that are consistent with Comprehensive planning. The Pennsylvania Constitutional Environmental Amendment (Section 27, Article 1) also directs that the Commonwealth's programs be such as to conserve and maintain the environment for the benefit of all the people thus all considerations affecting the environment must be included in the review of any proposed project. Land use plans and control are, of course, vested rights of local municipalities and are necessary for development in unsewered areas as well as sewered areas. Act 537 provides planning groups the opportunity to consider the broad environmental issues in land use development and thus will be a mechanism to develop plans which should be compatible with all areas of concern."

The Department also indicated at the hearing that in reviewing the EIS we would take into consideration the issues of growth control, costs, alternative treatment, spray irrigation, on-site corrections and the Chesterbrook Development.

In general then, the Department concurs with the conclusions reached by the EPA on page 273 of the draft EIS. The project as planned is necessary to eliminate the potential pollution and public health hazard caused by malfunctioning on-lot sewage systems throughout the project area. The Department, moreover, recognizes that the project is not based on a comprehensive land use plan which gives due consideration to environmental constraints and the protection of natural resources. t is important that such a planning process begin, if undesirable secondary effects, such as environmentally unsound development generated by the project, are to be avoided. 267

The shortcomings of land use planning in Chester County, however, should not be the cause for delay in approving the project for funding. Any delay on this basis would be intolerable to the Department, since the cost of the project will continue to rise during the delay and a much needed facility could become financially infeasible

CONTROL OF ADVERSE SECONDARY IMPACTS ON THE ENVIRONMENT

There will be sufficient time after approval of the project to resolve the issue of secondary impacts, since the development-generating effects for the project will not appear for some time, even though real estate speculation may be occurring now in expectation of the project's completion. Much work remains to be done to identify the specific areas where the project should not be allowed to generate development. Although EPA compiled a large amount of information about the project area, it failed to synthesize the data so as to define the areas which should be preserved. This failure of the EIS is discussed in more detail below.

The Department of Environmental Resources has issued permits for the treatment facility and sewer lines to serve presently developed areas. Additional permits for sewer extensions will be required before the entire design service area can be sewered. When the EPA and/or Chester County have identified areas of environmental concern whic should be preserved, this Department should be informed. The Department would then consider cooperating in the preservation effort by exercising its discretion under the Clean Streams Law, and its duty under Article I, Section 27 of the Pennsylvania Constitution, to deny permits for the extension of service into such areas. The Department would also consider the prohibition of connections to existing sewers through such areas, provided that such prohibitions did not seriously impair the project's financial feasibility. The Department recommends that EPA study the possibility of making such action at a later date, contingent upon the completion of further studies by EPA, an express condition of grant approval.

THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Chester County Plan is simply an agglomeration of municipal plans, each of which is based on conventional planning principles: the acceptance of growth and density trends regardless of environmental opportunities and constraints, and the concentration of development along major roadways. Thus, the Valley Forge Sewage Treatment Plant project as proposed reinforces the concept of continuing to concentrate development along the major transportation corridors, and to encourage intensive development of the Chester Valley.

263 EPA, in preparing the EIS, compiled a substantial amount of information about the natural environment in the treatment plant's Design Service Area. EPA described the "land suitability" approach for determining appropriate development areas and proceeded to map lands suitable for intensive and non-intensive urban development, with and without septic tanks, and for a public sewer system and also agricultural lands. However, EPA fell short of completing a real evaluation of the plan, using the environmental information. For example, the draft gives a detailed analysis of land use ordinances of the affected local areas. While this is useful planning information, its connection with the project is not established in the draft. Apparently the draft wants to stress the importance of environmental protection. However, in doing so, the environmental impacts of the project become secondary. These should be given a primary focus. For example, the draft only outlines the measures for protecting the Valley Forge State Park during pipeline construction but does not give any details of what would be affected in the Park.

An analysis was made of the township zoning ordinances, and the degree to which they considered environmental information was tabulated. Examples of further analyses which should have been made include:

existing land use compared with sewer plan -conflicts with natural resources including agricultural land and woodlands.

2) land use plans compared with natural resources - suitability maps.

3) environmentally sensitive areas map should include a) designation of prime agricultural lands, Class II and perhaps Class III soils and areas presently being farmed; b) aquifer recharge areas.

4) proposed development sites compared with sewer plan.

5) comparison of sewer plan with suitability maps.

In general, the draft should be reorganized to give the proper focus on the environmental impacts of the project. In doing this, much of the detailed information on the area's land use, flood plains, geology and water supply could be omitted.

Regarding costs: The project design population versus initial and projected population to be served, the supplemental population data prepared by the Delaware Valley Regional Planning Commission subsequent to the Department's processing of the permit-application suggests that the design populations would not be reached by the design year. The C. C. Collins data (Exhibit 3, Appendix 5) is based on the best available consulting engineers estimates and shows the project is financially feasible. The original population projections by the consulting engineers incorporated local municipal input. When comparing the consulting engineers population projections with the Office of State Planning total municipality projections, the expected growth in the total service area is realistic; however, on an individual municipality basis, the engineers projections for Schuylkill and East Whiteland appear high with Tredyffrin and Easttown appearing low. Even if the projections are high, and we do not feel they necessarily are, any cost saving on reduction of plant interceptor and pumping station would be minimal (1 to 2 million dollars.on 4% of total project costs) and would be offset by inflation if the project is delayed

Regarding spray irrigation: Availability and cost of acceptable land for spray irrigation would be highly questionable. A preliminary office study of the Valley Forge Park area shows the wooded areas present slope problems and the open areas are edominantly carbonate soils. Therefore, we question this as a spray irrigation area.

264

Regarding Chesterbrook: The specific question of the proposed Chesterbrook development was discussed in considerable detail by EPA, in response to the controversy generated by it. This is by far the most extensive development proposal in the Design Service Area. After examining the controversial environmental issues, EPA concludes that although "the design of 'Chesterbrook' does include positive concepts which may be perfectly acceptable in other areas of the county and this Region, it and other development similar to 'Chesterbrook' represent a threat to uncontrolled development in the Chester Valley, a critical environmentally sensitive area." Whether this project is approved is dependent upon the local municipality. If the entire project is approved it will require public sewerage facilities serviced by the Valley Forge project. The Valley Forge project is not dependent upon whether Chesterbrook is built. The environmental impact of Chesterbrook is being evaluated separately from the Valley Forge project.

Regarding Earth Sciences: Insofaras the geology, topography, and ground water statements made in this draft environmental impact statement are concerned, we concur.

Regarding Hydrology: Perhaps the strongest criticism for the draft is its use of questionable information. In section 2c Surface-Water Pollution (P.P. 46-47), the draft quotes Chester County's 1969 "Water Supply Sketch Plan" which favors the Mason-Dixon aqueduct from the Susquehanna to the Schuylkill River. This concept is also presented on Plate 18. The Mason-Dixon Plan is, of course, a very controversial issue. By giving it this kind of exposure (which has no connection with the project), the draft is implicitly endorsing it. There should be a strong objection to the inclusion of the Mason-Dixon concept, and particularly to Plate 18.

The enclosed copy of this Department's "Hydrologic Study of the Valley Creek at Valley Forge State Park" was used as a source of information on Page 37 and Page 246 of this draft. Flood discharges were computed by six methods as shown on Table 1, Page 6, of our Hydrologic Study. Design discharges based on this analysis gave 7100 c.f.s. for existing conditions and 10,800 c.f.s. for developed conditions of the watershed. These figures are comparatively higher than the 6,000 c.f.s. for fully-developed conditions as quoted in the draft. Our report concludes that urbanization of the Valley Creek Watershed would cause more frequent and greater severity of flooding at the Washington Headquarters.

Regarding Occupational Health: All rock drilling machinery must be equipped with either an integral water or exhaust ventilation dust suppression device shall be operated and maintained in proper working order.

Where noise levels exceed permissible standards, or where ear protection devices or administrative measures must be used to supplement engineering control, an audiometric testing program must be established.

265 Any lasers used for alignment work must be registered with the Department and any injuries resulting from the use of lasers must be reported.

Confined space entry (i.e. manholes, siphon chambers, wet wells, etc.) must be de in accordance with the Department regulations. In general, the regulations require a stand-by worker and that the worker be prohibited from entry into the confined space unless the air is tested, an acceptable respiratory device is used or the space be adequately ventilated. A copy of the procedures for confined space entry must also be submitted to the Department.

Confined space entry procedures as noted above must be developed by the municipalities and authority and submitted to the Department.

The draft EIS notes that a number of different types of alarms will be installed at the various pumping stations. The feasibility of including an alarm for combustible gases should also be investigated.

Pumping stations and chlorine rooms must contain provisions for adequate mechanical ventilation.

Emergency respiratory protective equipment (approved gas masks or self-contained breathing apparatus) must be provided for chlorinator areas and a program established to insure that the equipment is properly maintained and that employees are familiar with its use.

Page 260 notes that the noise associated with the incinerator blower is 100 dB. Although the statement notes that the noise from this source would not create a community noise problem, it could pose a serious occupational health problem if employees are in the area for a significant amount of time. The potential noise posures from all sources should be reviewed from an occupational health standpoint and engineering control incorporated where necessary.

The internal combustion units noted on page 260 for the emergency generators should be properly vented.

Potential dust exposures associated with the handling of solid materials associated with process operations should be reviewed and provisions made for adequate enclosure and ventilation where necessary. The addition of calcium oxide to a mixing vessel in filter process operation is one such case where dust exposures can be significant.

Where silica dust levels exceed permissible standards or where respirators or administrative measures must be used to supplement engineering control, a chest x-ray examination program must be established.

Regarding specific corrections and/or additions which should be made in the EIS:

a. Pg. 8: Spring City will be making application for funds in FY-75

b. Pg. 10: Upper Merion Trout Run plant flows currently less than design.

c. Pg. 9: Montgomery County Oaks plant has pending application for re-rating to 3.7 mgd.

d. Pg. 10: Radnor Haverford Marple plant is not overloaded. The plant s re-rated capacity is 5.4 mgd. Flows in excess diverted to Darby Creek Joint Authority system under agreement.

e. Pg. 10: Eastton Devon plant has been issued infiltration orders.

f. Pg. 12-Table 1: All listed cases do not have permitted treatment facilities and/or discharges. e.g.: Devault Packing, Great Valley Meat Market, James Spring and Richardson Ink are malfunctioning sub-surface system. R-H Carr out of existence.

g. Pg. 36: For the Schuylkill River, DER has established water quality standards.

h. Pg. 40-Table 9: Same comments as item (f).

i. Pg. 124 - paragraph A: Statement implies secondary treatment sufficient. should note that DER water quality standards require advanced treatment.

j. Pg. 130: On possible future phosphorus removal requirements, this doubtful.

k. Pg. 144 - Disposal in Water: This statement should be omitted as entirely inappropriate for this project.

l. Pg. 148 - package plants: A procedure for allowing proliferation of privately owned treatment plants is contrary to state planning requirements (DER, R & R Chapters 71 and 91).

m. Pg. 150: The last sentence in confusing. The indicated actions by local governments would not solve existing problems although it may prevent additional problems from occurring.

n. Pg. 152 & 170: Suspended solids requirements in DER permit is 15 mg/l.

o. Pg. 200 - regionalization: Project is regional as it serves the lower reaches of three adjoining watersheds.

p. Pg. 209 - 5 cfs is an error. It should be 12 cfs

CONCLUSIONS

On the basis of a preliminary analysis of the various factors suggested, the Department has drawn the following conclusions:

67

1) The area of major concern with respect to the secondary development impact of the sewerage plan is the Chester Valley, as much of it is currently in agricultural and open space uses. This area is important environmentally from the viewpoint of both agricultural land, aquifer recharge, and potential for groundwater pollution. The center section of interceptor line passes through this area and along the southern edge of the limestone valley, virtually ensuring its rapid development.

2) Of secondary concern is the northern section through Schuylkill and East Pikeland. The area to be served initially is already developed, and the soil is unsuitable for septic tanks. The problem is that future sewer extensions into the potentially serviceable area without adequate land use planning will be likely to jeopardize environmentally sensitive areas, especially farmland.

3) The area south of the Chester Valley is less critical, both because it is relatively suitable for septic tanks, and because it is substantially urbanized.

These and other conclusions should be evaluated in more detail and more thoroughly by EPA in order to determine the secondary effects of the Valley Forge Treatment Plan.

The Department recommends that, after grant approval conditioned on further planning, the EPA pursue the intense environmental investigation referred to on page 262 of the draft EIS. The techniques discussed above should be used to define potential problems in other areas with the same degree of specificity given to Chesterbrook. The Department of Environmental Resources will be willing to advise in such an effort, although the relevant planning programs of the department are still inchoate.

plan

MONTGOMERY COUNTY PLANNING COMMISSION
court house ▪ norristown, pennsylvania 19404 ▪ 215-275-5000

February 6, 1974

FEB 15 1974

Mr. Daniel J. Snyder, III, Regional Administrator
United States Environmental Protection Agency - Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Gen., Wavp, R3

Dear Mr. Snyder:

As requested in your letter of December 7, 1973, the Montgomery County Planning Commission has reviewed the Draft Environmental Impact Statement on the Valley Forge Area Wastewater Treatment Facility. We are very much concerned about the disposition of this project, having also attended the public hearing at the Consetoga Senior High School on January 10, 1974.

In previous correspondence, dated March 22, 1971, to the Delaware Valley Regional Planning Commission, we indicated that more investigation of reasonable alternatives for the disposition of wastewater from the Valley Forge Authority area was necessary. A review of the impact statement indicates the same conclusion. The following comments are offered pertaining to what we feel are serious problems or omissions in the draft statement. We hope you will give them your full consideration.

p.6 Reference is made to the initial service area. However, no map so labeled has been provided. It is impossible to compare the initial Service Area with the Design Service Area. This is an important omission since the undeveloped areas will be sewered under the assumption of maximum allowable development.

pp.60-74 This section begins by describing the planning efforts of the affected municipalities. However, it soon becomes apparent that the virtues of PUD in this portion of Chester County are being strongly extolled, almost to the extent of being a sales pitch. Is the EIS a forum for debating desirable land use growth patterns? The discussion, consisting of selected excerpts from numerous reports, lacks a framework and more seriously a conclusion. No attempt is made to relate the philosophy presented to the proposed sewage facilities plan.

p.10 Discussion of population growth is out of place. Population base should be discussed first, not eight pages later.

p.111 Discussion of housing is extremely cursory. No mention is made of housing supply and demand by type. Discussion is apparently limited to single family detached units; as such it is inconclusive.

p.120 Table 21 is deficient in that no attempt has been made to vary the watershed population allocations to the year 2020, with the exception of Tredyffrin Township. It is unrealistic to expect that the watershed portions of the constituent municipalities will retain the same proportion of total population for that time period. This is especially important since future service population is computed from the projections. An attempt should be made to estimate relative growth in an out of the watershed for the municipalities.

pp.121-123 Discussion of sewering assumptions is extremely sketchy - more documentation should be given.

p.138 Discussion of treatment site locations is inadequate. The EIS suggests that the Little Valley Creek location may be suitable, although cost comparisons do not exist. The discussion in general suggests more research needs to be done to do justice to the consideration of alternative sites. The admittance of inconclusive evidence is a flagrant violation of the intent of the impact statement requirement . 29

p.165 No explanation is given as to why alternative 2 has been chosen over 1, 3 and 4. On what basis was this decision made? What are the comparable costs and benefits for each? The discussion of alternatives is useless without a reasonable basis for such comparisons.

p.221 PECO has stated that power will be furnished if it is available. Is this contingent upon completion of the Limerick facility? If so, how will this affect the timing of the treatment plant construction? If not, when will the power be available?

p.233 Since there was virtually no discussion of existing socio-economic conditions, the impact discussed is incomplete. Mention is made of the community facilities which will be possible with a larger population; however, no consideration of the desirability of such growth is offered. Also, no mention is made of the costs related to the economic "benefits" mentioned.

p.237 The questions raised concerning future growth should be directly answered in the EIS.

Sincerely yours,

Arthur F Loeben

Arthur F. Loeben, Director

BOARD of SUPERVISORS of WILLISTOWN TOWNSHIP
CHESTER COUNTY
TOWNSHIP BUILDING
Sugartown Road, R. D. 2, Malvern, Pennsylvania 19355
647-5300

Joseph Neff Ewing, Jr., Esq.
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Vice Chairman
A. H. Wrenn

John L. Lukens
Secretary, Treasurer
William J. Davies
Zoning and Building Officer

February 6, 1974

Director, Public Affairs
Environmental Protection Agency
Region III
Curtis Building
6th and Walnut Streets
Philadelphia, PA 19106

Dear Sir:

In the interest of accuracy and consistency of information, please accept the following comments with regard to the Draft Environmental Impact Statement for the Valley Forge Area Wastewater Treatment Facility.

A. Table 29, Page 196:

The approximate range of rentals given for Willistown Township should be changed -

From:

Low	High
$148/year	$168/year

To:

Low	High
$212/year	$239/year

The adjusted range of rentals given above will more accurately reflect values of "Total Project Cost" and "Federal Grants" shown for Willistown Township in the table on page vii of the Summary section of the EIS.

Appendix A, attached, gives the derivation of the adjusted values and includes applicable comments.

B. With reference to the table on page vii of the Summary section of the EIS, values of "Total Project Cost" for East Whiteland, Malvern, and Easttown are inconsistent with data contained in Exhibit 4 of Appendix V.

C. The Sum of the "Total Project Cost" column in the table on page vii of the Summary is incorrect.

D. In the Summary section of the EIS, the report should make mention of the economic impact of the 75% Federal funding for sewage collection systems as provided by P.L. 92-500. (Reference: Federal Register Volume 38, Number 39 dated February 28, 1973, Sections 35.905-15, 35.920 (in its entirety), 35.925-12 (as it pertains to Willistown Township), and Section 35.930-5.

For example, a cursory financial analysis using the same input as that contained in Appendix A of this letter, but allowing for 75% Federal Grants for the collection system as presently proposed for Willistown Township would show that the system could be installed for the following costs to each individual homeowner:

Front Foot Assessment	$15.00	$12.50
Annual Rental	$68.00	$70.00

E. Table 15 (between pages 71 and 72):

Willistown Township -

The developers of apartments proposed in area W-6 on plate 15 are Walsh-Curley.

Dale Reese is the developer of the apartments listed in W-1.

F. Page 123 - Last Paragraph

Comments on Willistown Township:

Proposed apartments along Route 30 are in Valley Creek Drainage Basin, not Ridley/Crum/Darby.

G. Page 119 - Table 22

Population figures for portion of Willistown Township in Ridley/Crum/Darby Creeks basin are too high for present zoning. Discrepancy may be due to (F) above.

H. Page 191 - Table 27

The following industries should be deleted from Table 27. The industries are in Willistown and are listed on Table 26.

a. American Solder & Flux Co., Inc.
(Also appears as Force Chemicals Division in Table 27)

b. Betsy Ross Company

c. Deluxe Check Printers

By way of possible explanation those industries, while located in Willistown Township, now discharge sewage into a package treatment plant operated by Tredyffrin Township.

I. "Potentially Serviceable Area" shown on Plates 1 through 19 and comments on Potentially Serviceable Area as given on Pages 5 and 6 of the EIS - as they pertain to Willistown Township:

The potentially serviceable area shown for Willistown Township is far too extensive to be applicable to comments on "Potentially Serviceable Area" as given on pages 5 and 6 of the report.

Extending nearly three miles to the south of the three presently proposed pumping stations and at a lower elevation, the Potentially Serviceable Area would require extensive construction of pumping stations and force mains in addition to a collection system. The presently proposed pumping stations do not have the capacity required to handle the population density which would be required in this area to make sewering economically feasible nor is Willistown's present reserved capacity in the treatment plant sufficient for this purpose.

None of the area south of Jaffrey and Spring Roads "has received design consideration for service" at any time, and there are no plans, either at present or in the foreseeable future to change zoning in this area from the existing rural residential classification.

J. General Comments -

With regard to the improvement of water quality in the area's streams and waters, the various statements made throughout the report alluding to degradation of water quality, the table (Table 8) on pages 38 and 39, Plate 11, and the "Conclusions" of the EIS appear to be quite arbitrary. Perhaps a more meaningful presentation would be a comparison of numerical (quantitative) data on past and present stream quality in the areas to be sewered as compared to those water quality standards as given in Appendices A and B of the "Master Sewer Plan For Chester County, Pennsylvania", Revised Edition 1970. In addition, some quantitative comparisons on past and present stream quality in the area as it is related to the specific data contained in comments on pages 230 and 231 of the EIS may be helpful in describing the degree of degradation of water quality in area streams.

2 Also, we take strong exception to your conclusion "that enforcement of land use plans and zoning ordinances have not been effective", at least insofar as Willistown Township is concerned. We have vigorously defended the spirit and the terms of our comprehensive plan and zoning ordinance not only at the administrative level, but before the Zoning Hearing Board and various courts, including the Pennsylvania Supreme Court before which just last month we argued a case involving an attempt by a developer to construct apartment houses in the southwest corner of the Township. At the present time, we are also actively opposing an appeal in the Court of Common Pleas of Chester County by another developer planning an apartment and town house complex in the Township. We believe that a close look at the record of the municipalities involved in the Valley Forge sewer project will show you that they have been unusually energetic and successful in the enforcement of their land use plans and zoning ordinances within the framework of the existing state laws and court decisions.

We sincerely hope the information and comments contained in this letter will assist in your preparation of an accurate and meaningful Environmental Impact Statement on this project.

Very truly yours,

THE BOARD OF SUPERVISORS
WILLISTOWN TOWNSHIP

Joseph Neff Ewing Jr.

Joseph Neff Ewing, Jr.
Chairman

seh

APPENDIX A

Willistown Municipal Authority

Bond Proceeds

Construction Costs		$4,210,000
Engineering, Etc.		488,500
Capital Contributions		
Valley Forge Agreement	$282,156	
Valley Creek Agreement	263,507	545,663
Land and Rights-of-Way		50,000
Administrative		23,000
Bond and Local Council		50,000
Assessment Expense		30,000
Contingencies		421,000
		$5,818,163
Less Federal Grant		
@75% of Eligible Costs ($1,608,400)		1,206,300
		$4,611,863
Capitalize One Year's Debt Service		261,660
Interest During Construction (2 years)		596,505
Bond Discount		106,732
		$5,576,760
Less Interest Income on Funds		240,139
Bond Issue		$5,336,621

		Capitalize Int	Capitalize B/D
Assessments:			
123,000 ft. @ $15.00	$1,845,000		
@ 85%	1,568,258		
Issue of Assessment Bonds @ 4%	1,568,258	$125,460	$31,365
Issue of Revenue Bonds @ 6½%	3,768,363	471,045	75,367
	$5,336,621	$596,505	$106,732

Annual Requirements With $15.00 Assessment

Debt Service		
$3,768,363 x .069436 (6½% for 38 yrs.)	$261,660	
Coverage @ 10%	26,166	
Authority Costs	4,000	$291,826
Operating Costs:		
Willistown	25,000	
Valley Creek	7,490	
Valley Forge	25,257	$57,747
		349,573
Less Income from Debt Service Reserve Fund @4½%		11,774
Annual Requirement		$337,799
Collections @ 97%		$348,246

Present Unit Estimate	Annual Rate	With 100 Additional
1,542	$225	$212

With $12.50 Assessment $368,576

Present Unit Estimate		
1,542	$239	$224

Prepared By
Willistown Township
Dec. 1973

Comments: All data and methods used in the derivation of annual requirements given in this Appendix A are the same as those used in Exhibit 4 of Appendix V for Willistown Township with the exception of those cost directly relating to construction and operation of the Willistown System. As indicated in the letter, the values used have more accurately reflected those used in the E.P.A. grant award to Willistown.

APPENDIX A

Willistown Municipal Authority

Bond Proceeds

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Annual Requirements With $15.00 Assessment

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		349,573
Less Income from Debt Service Reserve Fund @4½%		11,774
Annual Requirement		$337,799
Collections @ 97%		$348,246

Present Unit Estimate	Annual Rate	With 100 Additional
1,542	$225	$212

With $12.50 Assessment $368,576

Present Unit Estimate		
1,542	$239	$226

Prepared By
Willistown Township
Dec. 1973

Comments: All data and methods used in the derivation of annual requirements given in this Appendix A are the same as those used in Exhibit 4 of Appendix V for Willistown Township with the exception of those cost directly relating to construction and operation of the Willistown System. As indicated in the letter, the values used have more accurately reflected those used in the E.P.A. grant award to Willistown.

VALLEY FORGE SEWER AUTHORITY
CHARLESTOWN - EAST PIKELAND - AND SCHUYLKILL TOWNSHIPS
CHESTER COUNTY, PENNSYLVANIA
808 VALLEY FORGE ROAD - P. O. BOX 629
PHOENIXVILLE, PENNSYLVANIA
935-1553

January 18, 1974

Director of Public Affairs
EPA, Region III
Curtis Building
Philadelphia, PA 19106

Gentlemen:

On behalf of the Valley Forge Sewer Authority I am pleased to present public testimony in regards to the draft environmental impact statement for the Valley Forge Area Waste Water Treatment Facility dated November, 1973. This Authority has been commissioned by elected officials with the responsibility of planning, designing, constructing, financing, and operating sewerage facilities within the framework of the laws of the Commonwealth of Pennsylvania and agreements with associated municipalities in order to alleviate the sewerage problems of the area.

In reviewing the draft statement's conclusions, we are pleased to see that EPA agrees that degradation of water quality in the area and the existing and future public health hazards justify the proposed action. The several Authorities have worked under this belief for many years to develop a viable solution to these problems in Northern Chester County. We are especially pleased because we feel that by working together with the responsible elected officials we can improve the environment in which we all live and work.

While best left to the testimony of the individual municipalities, we do not agree with the conclusion that implementation of the proposed action will necessarily result in a high probability of uncontrolled development. We would like to point out that the implementation of the proposed action provides a needed service for existing conditions; but should increased development be desired or imposed on any of the communities, the proposed system allows for orderly development. We believe that the various components of the system are sized for optimum cost-effectiveness and flexibility and that it employs the most up-to-date proven technology appropriate for installations of the required scale in this suburban area.

Much confusion has arisen because of varying definitions of the concept of a "region" for sewerage planning purposes. We feel the relevant definition is "a logical service area as determined by both geography and economics". By this definition, the Valley Forge project is indeed regional.

The Valley Forge Sewer Authority, after many years' experience in this project, would like to go on record with the following points:

1. The proposed action is required to alleviate environmental degradation of the project area and eliminate existing and forthcoming public health problems from currently developed land.

2. The project is financially, technically, environmentally, and administratively sound.

3. The estimated costs of the proposed action has been escalating at the rate often exceeding 10 per cent per year due to inflation.

As costs to the citizens of the area was a prime concern leading to the necessity for preparing this impact statement and is a prime impact, we would think that a brief discussion on the inflationary costs of delay is in order.

Page vii of the draft statement summary shows various costs including grant amounts and the total project costs. The grant amount figures are based on the original estimates presented to the Commonwealth of Pennsylvania and EPA in March, 1971. The grant amounts were computed as a percentage of these estimates and not on actual costs. To date, the Authorities have been asked for the sake of consistency not to present updated figures. While it is agreed that apparently conflicting figures from many sources create confusion, it must be made clear to all concerned that these estimates are now old; and inflation in construction costs of sewerage facilities has been escalating at varying rates since the original request for Federal funding was made. The construction costs increases on this project were once estimated at an average of $350,000.00 per month, and there is no reason to believe that this inflation has ceased. The socio-economic impact section of the draft should reflect the financial impact of the actual costs of preparation of the environmental assessment and the statement, plus this much larger cost of inflation. It is our opinion that the cost of the total project has increased by five to six million dollars within the last 18 months.

Again, referring to the same table, we would like to remind EPA and the concerned citizens that we have been informed the $15,122,150.00 grant amount for the 1972 projects is fixed and that the balance must be borne by local financing. It is this balance that grows.

The statement does not reflect that at the time of application for the treatment plant and interceptor system, the collector sewers, a major portion of construction costs, were not eligible for Federal funding; and that since the time of these applications, the revised Water Pollution

Control Act (PL92-500) does provide for Federal funding of the collectors. The citizenry should be aware that each municipality did submit a supplementary application for Federal funding for collector sewers in 1972 when the law was passed. Funding of these applications, which are as much a part of the proposed action as the treatment plant and interceptors, would have a major beneficial financial impact on all users.

In addition, the Authority is also aware that EPA and the Commonwealth of Pennsylvania now fund projects on actual costs and not estimates. There appears to be unfairness when our Authorities are informed that their projects will be funded based on fixed figures with users paying for the increased costs due to delay and inflation not of our making. This unfairness is made more acute by the fact that one of the Municipalities in this project was delayed in submitting their application which led them to be funded by the much more liberal 1973 rules. We would like to urge the EPA to use their influence to see that this action is funded in accordance with actual construction costs.

These two positive steps: 1) funding the supplementary sewer applications; and 2) funding on actual construction costs; will go a long way to offset the negative economic impact of this action.

We trust that EPA will endeavor to see that these actions are discussed in the draft and that they are implemented.

Thank you.

Sincerely,

VALLEY FORGE SEWER AUTHORITY

Joseph Weinstock (br)

Joseph Weinstock, PhD.
Chairman

JW:br

Blanco

EAST WHITELAND TOWNSHIP

PLANEBROOK ROAD, FRAZER, PA. 19355

Board of Supervisors
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Township Manager

GARY R. LONG
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TOWNSHIP OFFICE
Niagara 4-2452

TAX COLLECTOR
Niagara 4-2985
CHARLES A. MERROTH

POLICE DEPARTMENT
Niagara 4-3313 Niagara 7-1442
ROBERT A. REDZIG, Chief

January 7, 1974

Director, Public Affairs
EPA - Region II
Curtis Building
6th & Walnut Streets
Philadelphia, Pa. 19106

Attention: Daniel J. Snyder III
Regional Administrator

Subject: Valley Forge Area Wastewater Treatment Project

Gentlemen:

East Whiteland Township formally requests permission to express its views and make certain comments regarding the Draft of the EIS dated November, 1973.

A. Comments on Draft as submitted:

1. Page 16 - The words "Suggested to be" should be inserted ahead of the words "economically favorable" on line 2. As has been subsequently proven, the Regional guidelines as interpreted by the regulatory agencies has become more expensive than the plant initially proposed for Little Valley Creek.

2. Page 12 and Page 40 - Table 1 on page 12 is obviously incomplete when compared with Table 9 on page 40.

3. Page 42 - It should be noted that the largest aquafier in Chester County passes beneath the Knickerbocker Landfill and that this landfill operation should be discontinued as rapidly as feasible in order to protect this large drinking water source.

4. Page 65 - The use of the word "resignation" in line 3 is not acceptable to East Whiteland. The town leaders over the years have given full recognition to both the problems and the opportunities offered by the railroad and highway systems passing through our area.

As to a committment to "development", East Whiteland also is "Quarry Country" and as a result has several active and several abandoned quarries in its northeast quadrant. Thus with heavy trucks constantly using our highways for either the hauling of stone or the hauling of trash to the old quarry holes we feel that our planning must logically recognize these existing facts of life and plan around them. This results in zoning of a relatively large industrial area arranged with buffers so that residential areas and open space will remain relatively pleasant and appealing to the eye.

In East Whiteland planning and protection of our zoning and land use ordinances has high priority due to the extreme pressures that are constantly being brought on us by developers.

With the completion of sewers East Whiteland's long experience with developers will cause the Township to act with greater resolve than normal in maintaining the full intent of our Comprehensive Plan.

27 5. Page 273 - In light of the EPA comments regarding East Whiteland's views on planning (page 65) and the sweeping statement on page 273 regarding lack of enforcement of zoning ordinances, East Whiteland wishes again to take exception to EPA's view since we have substantial evidence with both Supervisors' Hearings and Zoning Hearing Board decisions to refute this view.

B. Other Comments:

1. At our December 12, 1973, Supervisors' meeting the question was raised as to equitability of sewer costs between individual households and industrial users. Our answer is that no segment or parties in the East Whiteland sewer area are to receive any preferential treatment. Industry and commercial users will be charged based on a benefit basis so that all users will have a fair sewer charge based on use.

2. East Whiteland has recognized a need for sewers in certain of our highly populated areas since 1958. In 1966 the financing of this need became feasible and our effort has progressed steadily toward this end since that time.

3. In spite of East Whiteland's continued efforts to obtain sewers for these high vulnerable areas we have been faced with serious delays for a period of over 7 years. In that time costs have more than doubled. East Whiteland feels that no further delays should be permitted as cost are continuing to rise. We feel that adequate opportunity has been afforded all parties who may have questions or objections and that further delays will serve no useful purpose.

4. It should be noted that East Whiteland Township is preparing to adopt a new Comprehensive Plan and Zoning Ordinance and that this new plan contains provisions for flood plain protection, open space and other important zoning regulations that are fully coordinated with our sewer program.

Your consideration of these points in your final deliberation will be greatly appreciated.

Very truly yours,

East Whiteland Township
Board of Supervisors

Edwin L. Lewis, Jr., Chairman

R. M. Burford
Robert M. Burford, Vice Chairman

Harold F. E. Jeunet
Harold F. E. Jeunet

DATE: January 7, 1974

TO: All Residents and News Media

FROM: East Whiteland Board of Supervisors

Since 1958 your Township has needed sewers in certain critical areas. In 1968 a Municipal Authority was formed to plan and finance these sewers. Money has been spent on engineering and considerable time on planning and communicating data to our residents.

Now we are one of 8 Townships forming the Valley Forge Sewer Authority and our program is subject to review by a much larger public body. In all, 37,000 people are to be served by this sewer system. For the past 2 years the sewers have been subjected to delays caused largely by groups or individuals protesting or raising questions about the system.

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It is the judgment of this Board of Supervisors that a suitable effort has been made to satisfy all the questions or to correct any problems created by the sewer system. We feel that ample opportunity and publicity have been given to the people who are to be served by this system so that full and complete discussion has been accomplished.

In view of the serious health threat that continues in our area to be served with sewers, and in view of the continuing rise in costs as delay is added to delay we recommend that the sewer program proceed with all due speed and that all of the residents of East Whiteland actively support this important program.

215) NI 4-2602

Council Chamber
BOROUGH of MALVERN
Malvern, Pa. 19355

January 10, 1974

Valley Forge Sewer Authority
808 Valley Forge Road
Phoenixville Pa.

Gentlemen:

The Malvern Borough Council and Planning Commission have reviewed the draft of the Environmental Impact Statement for the Valley Forge Area Wastewater Treatment Facility dated November, 1973

We desire to go on record as disapproving the conclusion reached on page 208. It is our belief that the investigation has not adequately considered potential effects upon the Borough water supply in depth. We have presented this problem to our consulting geologist and based upon his conclusions, we are satisfied that the effect of the sewers upon the Borough water supply will be minimized due to the planned conversion to a well system, with springs being used only for emergencies. The statement on page 208 "Despite a potential relief resulting from the drilling of new wells, it is anticipated that sooner rather than later the community will have to rely more heavily on the already available Philadelphia Suburban Water Company supply or another alternate surface-water source." is incorrect. There is no indication at this time that the Borough will have to rely more heavily upon the Philadelphia Suburban Water Company. We have enclosed a letter from our geologist which supports this position.

Further, Council is not in agreement with the conclusions reached on Page 273 of the draft, regarding the enforcement of land use plans and zoning ordinances. It is the intent of Borough Council to enforce land use and zoning ordinances within the Borough and this conclusion is not valid for Malvern.

We would like to emphasize that neither the Borough Council nor the Planning Commission is in any way opposed to the sewerage project, so long as the same is constructed in conformity with sound building and environmental standards.

The Borough of Malvern, and all its agencies, stand ready to assist your agency in any way which will help promote the most balanced approach to land use and environmental protection.

Signature required by majority vote January 17, 1974

Thomas A Randolph
Thomas A. Randolph, Chairman
Malvern Borough Planning Commission

See also minority report TAR

Sincerely yours,

L. Clifford Lewis
L. Clifford Lewis, President
Malvern Borough Council

ROY F. WESTON, INC.

ENVIRONMENTAL SCIENTISTS AND ENGINEERS

REPLY TO
ROY F WESTON INC
LEWIS LANE
WEST CHESTER
PENNSYLVANIA 19380
215 692 3030
TELEX NUMBER 83 5348
CABLE ADDRESS RFWINC

9 January 1974

MALVERN BOROUGH COUNCIL
MALVERN PLANNING COMMISSION
MALVERN MUNICIPAL AUTHORITY
Malvern, Pennsylvania 19355

Gentlemen:

In response to your request over last weekend to review the Valley Forge Treatment Plant Environmental Impact Statement, I hope this letter will serve as background of that review.

The points raised by the Malvern Planning Commission express a concern of decreasing water availability for the Malvern Water System resulting from diversion of domestic wastes presently utilizing on-site disposal systems. The primary basis of their concern stems from the conclusions drawn in the impact statement stating that diversion of sewage flow from the Malvern area would have negligible effect on the water supply system. A second conclusion in the report states since Malvern has consistently had water supply problems, there is a distinct likelihood of Malvern connecting with Philadelphia Suburban Water System.

In view of the time constraints, my remarks last night and the background for this letter are based on previous experience in our ground water resources projects for Malvern and investigation of subsurface conditions as a part of the sewer feasibility study. The points of concern may be divided into two categories. The first dealing with a continuing availability of water from the springs and a second dealing with availability of sufficient total water supplies for the Malvern system.

At present the springs contribute between 60 and 70 percent of the total water supply. These springs are located in close proximity to King Road which is essentially the topographic divide. Relocation of the disposal point of the water presently discharged underground from approximately one hundred homes in this drainage area will remove as much as 35,000 gpd. At the present time Malvern is pumping approximately 325,000 gpd. The diversion of approximately ten percent of the potential water source would affect water levels in this area. The degree of effect and whether springs will be inoperable cannot be determined without further investigation. It is likely that relocation of this water could detrimentally affect the springs. The wells in the same water company property would not be as prone to a change in water availability due to the deeper water entry points in a well system.

At the present time one new well has been completed and the pumping facility is being designed by our firm. This well is located in a separate drainage area at a location further down slope in the drainage basin where a lesser effect of removal of potential recharge would be anticipated.

The five year water system improvement program recently adopted by Malvern Borough Council calls for construction of additional wells and pumping facilities at other locations within the Borough and surrounding area. These facilities would be located with full knowledge of the then existing sewer system in the lower topographic elevations. It is anticipated that the water development program would proceed in a manner to maintain sufficient water supplies for the system at all times.

In summation construction and operation of the sewer system will likely have an effect on water levels in the spring supply area. The degree or extent of effect cannot be predicted at this time unless further studies are conducted. The present and future wells to be utilized as water supply sources would not be affected to a similar degree due to their deeper water entry points. The five year program of expansion and modernization of the water system can provide additional water supply sources prior to construction of the sewage system in order not to place Malvern in a dangerous position in regard to water supply.

I would hope that my remarks last evening and this letter of clarification will be sufficient for your needs.

Very truly yours,

Walter B. Satterthwaite, Jr.

Walter B. Satterthwaite, Jr., P.G.
Manager of Geology Division

WBS:lk

cc: T. Randolf
G. McDonnell

February 8,1974

Re: Draft Environmental Impact Statement,
Valley Forge Area Wastewater Treatment Project

Mr. Daniel J. Snyder III
Regional Administrator
Environmental Protection Agency, Region III
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The undersigned are expressing their continued concern with the potential hazard to Malvern's municipal water supply by the lowering of the water table due to the impending Project.

2 We are not at this time stating a position for or against the Project as a whole or even stating categorically that Malvern's springs and wells will dry up as soon as the proposed sewer system starts to remove the water. We have been recycling locally from our on-the-site sewer systems.

What we are stating is that the Draft Environmental Impact Statement's pages 207 and 208, where it treats with both the generalities and the specifics of Malvern's potential problem are so inadequate, irrelevant and erroneous as not to constitute an environmental impact statement at all, and to be in violation of the philosophy of the Environmental Policy Act of 1969.

We quote the Statement in two parts. Here is the first, starting at "Impacts on Water Supply" in the middle of page 207 and going to the middle of page 208:

"The primary long-term effects of the project on water supply are twofold: (1) the potential lowering of the ground-water table and (2) flow reduction of the inland streams.

"Effects on Water Table: Because of abundant rainfall and the limited capacity of most of the underlying rock to absorb and store water, a potential lowering of the water table is difficult to evaluate under normal weather conditions. In the event lowering of the water table should take place, the elimination of septic waters would have the beneficial secondary long-term effect of compensating for a potential decrease in water quantity by a definite increase in quality since normal water runoff will be able to replenish the aquifers.

"If we assume one family per acre and 350 gpd per family, the annual discharge per family per acre can be calculated as follows:

350 x 365 = 127,750 gallons per year per family

7.48 gallons - 1 foot^3

127,750 gallons per year = 17,800 feet^3 per year per family

1 acre - 43,560 feet^2

$\frac{17,080 \text{ feet}^3}{43,650 \text{ feet}^2} = 0.392$ feet - 4.7 inches of water per acre per year

"This diverted discharge will be minimal compared to the average rainfall in Chester County of 45 inches even if it is considered that only 50% infiltrates the ground to replenish the aquifer and the streams. Consequently, it is not anticipated that a significant impact (beneficial or adverse) on the groundwater table or groundwater supplies will occur."

Regarding item (1), lowering of water table:

There is no reference here to areas like Malvern, which is located along a ridge and, being a relatively old and compact community (2800 population within 1.2 square miles), has a high percentage of impervious cover, coupled with steep slopes that would markedly reduce rainwater replenishment of the aquifer.

Regarding the "elimination of septic waters":

Malvern is not without a minor amount of cesspool problems, but we have been drinking our recycled water for many years. Also, on the south slope (the more gradual slope and the slope where we have had some cesspool problems and from which we get our water supply) there has been no significant contamination downslope into the natural surface water, the headwaters of Ridley Creek. This last has been stated by a reputable stream biologist and this information has been available to you from the U.S. Geological Survey and from the Chester County Water Resources Authority.

Then you state:

"Of specific conern to area residents and the Malvern Borough Planning Commission is the possible decreasing water supplies for the Borough due to a lowering of the existing water table. Investigations into this problem indicate that the potential lowering of the water table would have a minimal adverse impact on the water supply of the Malvern Borough area primarily due to two circumstances: (1) the proposed project would have no anticipated impact on the recharge area for the Malvern area which consists of slopes unsuitable for development and (2) the water shortage is a recurring problem in the area. Despite a potential relief resulting from the drilling of new wells, it is anticipated that sooner rather than later the community will have to rely more heavily on the already available Philadelphia Suburban Water Company supply or another alternate surfacewater source."

Re "the investigations into this problem":

This seems to refer to the 45-minute visit of two gentlemen from Buchart-Horn Company who, according to an ordinarily reliable witness, never left the Borough Office to go and look at the water system.

Then in item (1): "no anticipated impact on the recharge area for the Malvern area which consists of slopes unsuitable for development":

This is a simply untrue.

Again, this is the south slope, and a large landholder in this area has put in writing his intention to develop it. This information also was available to you.

Then item (2): "The water shortage is a recurring problem in this area" and you say we will have to turn to Philadelphia Suburban Water Company for our supply.

Is this the way you deal with environmental impact, by driving us into the arms of commercial supplier for our water? Have you conferred with this company to get its assurance that it can supply Malvern at a future time when and if its wells dry up?

On December 12, 1973, the Chairman of the Water Committee of Malvern Borough Council publicized a $480,000 Capital Improvement Plan for improving our municipal water supply. How does this tie in with your recommendation to go to Philadelphia Suburban? This plan is not new. Its essentials have been available since the S.C.R. Corporation water study was released September 13, 1971. Also, do you know that the Borough refused to sell our system to Philadelphia Suburban last year?

However, the above paragraph touches mostly on the financial hardships that unconsidered action may inflict on the Borough, so let's get back to the strictly environmental issue. In the enclosed letter to Mr. Blanco there is a reference to a Borough Council letter of January 10 (and a letter from Roy F. Weston, Inc.) that seems to show a different shading of opinion from the authors of this letter. In it, in the middle of the second paragraph, it mentions converting spring water sources to "only emergency" use. The release on the waterworks' capital improvement (see circled item) says, for 1976, "remove springs-utilize as standby." But even Weston's letter very wisely points out that the springs will be the first source to be affected. Hardly a very reliable emergency reserve.

Mr. Blanco's letter also asks "What further information or documentation" can be given you. Some questions were asked of people knowledgeable in this field (not having the time or funds available to undertake technical studies, and also feeling that this type of research should come from the E.P.A.). These questions were asked using the parameters of Malvern's topography, geology from standard published maps, and the description of local geology by a well-qualified employe of Roy F. Weston, Inc. Incidentally, the latter source confirmed our understanding that Malvern receives no water from any miraculous source - no underground streams or porous limestone formations, etc., but depends on the rain that falls on its 1.2 square miles.

The answers:

Dr. Robert Schonenberger, Hydrologist, Drexel University said this problem seemed to be the result of poor planning.

Dr. M. H. Levin, Pres. of Environmental Research Associates, Devon, Pa., seem to be some inconsistencies in the contention of negligible impact (on water supply) if Malvern is actually dependent for its aquifer charge only on rainfall. The matter definitely deserves further study by specialists not commercially involved in sewering.

Mr. Thomas Cahill, Executive Director, Tri-County Conservancy - We have reason for concern. Usually the impact of sewers has minor effect on water supply but because of our location on a ridge the quantity of loss of shallow groundwater from our area could be significant, particularly with the huge apartment complexes coming in with such a high percentage of impervious cover. Also, over a period of years there can be appreciable loss of shallow groundwater by channeling along the bottom and sides of sewer pipes in the loose rock in which they are bedded, especially from a community on high ground with sewer pipes leading down steep slopes. (Mr. Snyder, what effect do your studies forecast on this last point?)

Mr. Thomas Gay, Development Mgr., Open Spaces, Wissahickon Valley Watershed Assoc. - Very concerned - page 208 very inadequate, not valid; a "negligible drop" is not negligible if there is a limited water potential.

Dr. Claude E. Nolte, Geologist, Villanova, Pa. - If we get 15,000,000 cubic feet/year in rainfall and 1/8 soaks into the ground, then up to 50% of our water supply would be recycled if we drain from the total area, as an educated guess. Also, if we lose a given percentage from our springs, we can lose 3/4 of that percentage from our well output too, only not as soon.

The above comments were freely given by these gentlemen to one of the undersigned solely out of their public spiritedness and kindness and are quoted to best recollection. They and the other facts and opinions of this letter are not intended to consitute a court case for or against sewering.

289 However, we feel that after reading the above you must feel that inadequate study has been given to possible deleterious effects on the water supply of the Borough of Malvern, a matter that vitally affects the health, safety and welfare of its inhabitants.

Sincerely,

Thomas A. Randolph
Malvern Borough Plan'g Comm.
Rolf A. Brackwitz
Malvern Planning Comm.

Jarold J. Sedlacek
Malvern Borough Council

BOROUGH OF MALVERN
PLANNING COMMISSION
FIRST AND WARREN AVENUE
MALVERN, PA. 19355

February 9, 1974

Mr. Robert J. Blanco, P.E.
Chief, Environmental Impact Branch
U.S. Environmental Protection Agency, Region III
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Blanco:

Thank you for your letter of January 16 requesting more details than given in the Commission's letter of January 2. Please pardon my delay in replying, as it did not reach me until recently.

The Commission's letter simply says that at our regular meeting of December 18 the members present unanimously agreed that the treatment on pages 207 and 208 of the Impact Statement did not adequately deal with our concern about the future of Malvern's water supply.

Since that letter, the Malvern Borough Council has written the Valley Forge Sewer Authority, enclosing a letter from Roy F. Weston, Inc., with copies to you, a letter dated January 10. This letter has so many conditions in it that it seems to be ambivalent, but it appears to shade the previous stand of the Commission, who by majority vote on January 17 required that I sign it as chairman, which I did, with a notation: "See also minority report."

The Malvern Borough Planning Commission's by-laws are explicit in stating that its chairman may make no written policy statements committing the Commission without consent of the body. Therefore I am sending you a copy of this minority report (enclosed) as a separate letter, and I hope it will answer you request for more information.

Sincerely,

Thomas A. Randolph

Thomas A. Randolph, Chairman
Malvern Borough Planning Commission

LAW OFFICES
GAWTHROP & GREENWOOD
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WEST CHESTER, PENNSYLVANIA 19380
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ROBERT S. GAWTHROP, JR.
W. EDWARD GREENWOOD
WILLIAM H. RIVOIR, JR.
JOHN S. HALSTED
ROBERT S. GAWTHROP, III
ROGER E. LEGG

EXTON OFFICE
109 E. LINCOLN HWY.
EXTON, PA. 19341
(215) 363-1717

January 14, 1974

Mr. Daniel J. Snyder, III
Regional Administrator - Region III
United States Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

We represent Tredyffrin Township Municipal Authority, and desire to go on record in favor of the Draft Environmental Impact Statement prepared for Valley Forge Area Wastewater Treatment Facility, but to make certain comments with respect thereto and to the testimony at the hearing held at the Conestoga High School on January 10, 1974.

The draft makes clear that Tredyffrin and other areas have suffered from soil and water degradation resulting from on-site cess pools and septic tank systems. Our Authority was created to put an end to the problems arising out of the deficiencies of such treatment. They have been arrested to a degree, but until a proper sewer system is installed, they will continue.

Tredyffrin is the largest municipality in the County, let alone the area, and its development is substantially complete. The people came despite the fact we had no such sewer plant as now proposed. In every case, the sewers followed. The adoption of the draft can only serve to eliminate problems in other municipalities within the watershed such as those that confronted Tredyffrin.

The adoption of this expandable project now to accommodate a present and future needs will eliminate further expense resulting from inflation and justify the very substantial expenditures already made by the municipalities in an effort to solve their common problems.

In conclusion, it should be pointed out that Tredyffrin, with its Comprehensive Plan, its Planning Commission, its active Supervisors and a long-established zoning program has been at the forefront of municipalities seeking to secure an orderly growth and healthy environment for its citizens. Many of the leading zoning cases in this Commonwealth have been a direct result of its efforts to control land use. The fact that the Supreme Court of Pennsylvania has, in some cases, prevented such control as some would desire should not serve to minimize the dedication and accomplishments of its citizens acting through those bodies. The plan should be adopted forthwith to give us sewers everyone agrees we need, and give them to us now.

Very truly yours,

Robert S. Gawthrop Jr.

RSGJr:CNL

cc - Tredyffrin Township Municipal Authority
Mr. Howard P. Haines

VALLEY FORGE AREA
WASTEWATER TREATMENT FACILITY

Written comments to supplement testimony at the January 10, 1974 public hearing on the draft Environmental Impact Statement written by the Environmental Protection Agency

Green Valleys Association
Birchrunville, PA 19421
Phone: 827-7800
February 8, 1974

Introduction

There is need for public sewers in many parts of northern Chester County. On-site disposal systems have been installed in inappropriate areas and so health hazards and water pollution are the result. These problems must be solved, but the solution must be one which does not create other problems.

After careful study of the draft EIS and after discussion with several consultants, we feel the proposed plant will cause problems in several areas unless some of the plans are changed. Our concern is with the safety of the proposed site, with the effects of growth which will be caused by this plant, with the choice of service area, with the effects on ground water, and with the lack of adequate analysis of alternatives.

Growth

We have submitted oral testimony on the impact these sewers will have on growth in this area. Those comments are valid, but will not be restated here; I do repeat the request that the impact of sewer-caused growth be evaluated in the final EIS. Since no one other than EPA is in the position to evaluate the impact of growth on this area and since growth will take place where sewers are available and since EPA can make the decision on sewer availability, EPA must not avoid the responsibility for making this evaluation. Growth is not in the hands of the townships; it is in the hands of those who fund public projects. If we are to have the orderly growth which is one of the stated aims of this project, EPA must insist upon some controls upon the rate of growth. If a plant is to be built and is to reach its capacity in 1985 and if this is considered to be orderly growth, controls must be available to insure that the capacity is not reached before then. 29

Ground Water

On p.208 the EIS says that 4.7 inches of water/acre/year will be diverted from the watersheds. It also says that of the 45 inch annual rainfall 50% enters the ground. Even without considering that transpiration removes a very considerable amount of the 22.5 inches which enters the ground, 21% of our ground water recharge will be lost.

There are areas besides the Borough of Malvern which are experiencing considerable problems with their ground water. The southern portion of Schuylkill Township has a very marginal water supply and cannot afford to ship any of its water out. Five large wells were drilled by Wyeth in the 1940's in the Kimberton area. These were regarded then as excellent wells. Now only one of them is still producing and it can only be pumped for short periods of time. It must then be allowed to refill. It is clear the water table is dropping there; Kimberton also cannot afford to export its water. When, on p. 206, the EIS say ground water pollution problems will be eliminated it is partially right - in some areas a good deal of ground water will be eliminated also.

Service Area:

The concept of regionalization is stressed in the draft EIS. On page 203 we find that French, Pickering, and Valley Creeks are going to have the causes of pollution eliminated. It is not mentioned there that this will only be from a portion of each watershed. There are marginal package treatment plants on all these streams which are not being eliminated by this proposal. Valley Creek alone has two at Immaculata College, one at the Bacton Trailer Court, one at Great Valley High School, and one at Great Valley Wastewater. It seems a bit futile to worry about cleaning up the lower reaches of a stream when the headwaters are continually befouled. A sewage treatment region which treats only portions of watersheds is not an environmentally sound region. Reasons were not given for excluding the current Spring City and Phoenixville plants in this system. The reasons for their exclusion as well as the reasons for the exclusion of headwaters should be given in the final EIS.

Safety of the proposed site

On pages 213-216 the likelihood of site flooding is discussed. The lowest unprotected portions of the plant were designed to be 8.3 feet above the elevation of the 100-year flood. Hurricane Agnes in 1972 came within 5.5 feet of the plant. In this area, a 100-year rainfall is defined as producing 7 inches within 24 hours. Agnes was not a 100-year rainfall in the Schuylkill River Basin. In Reading 6.49 inches fell; in Coatesville (only 8 miles out of the basin) 3.75 inches fell; and in Phoenixville, just upstream from the proposed plant, 3.23 inches were recorded. We realize that there is a difference between a 100-year flood and a 100-year rainfull, but when a storm depositing somewhat over 50% of a 100-year rainfall chews up 34% of your safety margin, it is reasonable to fear that the margin is not large enough. The assumption is made that flooding will not increase in the future. This could only happen if there will be no development upstream from the plant site - a highly unlikely event. Paving and development of upstream areas will increase flooding at the plant site. We should not expose our downstream neighbors to the health hazards created by a flooded treatment plant.

Spray Irrigation - An Alternative

One alternative which we feel was given unfairly short shrift is that of several small spray irrigation plants at the sites of need. Kimberton has quite a cluster of sewage problems; it also has lots of open land around it. This would be a perfect site for spray irrigation. Another good general site would be in Willistown. Here again we have a cluster of problems with nearby open space. The homes in Schuylkill Township on Maisfield Road could also be served by a spray irrigation system. Specific site selection is not possible without on-site soil samplings and study.

The EIS is incorrect in many statements on the effects of spray irrigation. A letter from our consultant, Dr. William Sopper, is attached which will correct these statements.

We stress strongly that spray irrigation is an environmentally sound method of effluent disposal; it should be evaluated thoroughly and reasons for its acceptance or rejection should be clearly given in the final EIS.

Other Alternatives

Generally, the alternative section is hard to understand. Some statements are made about a few possible alternatives and then a decision is noted with no justification. We would like to see reasons for both the acceptance and the rejection of the alternatives. We would also like to see cost-benefit analyses of the alternatives.

A subregional plant for Malvern Borough and Tredyffrin Townships was not considered. By looking at Tredyffrin only, the value of a subregional plant appears less than one combining the two would have. The alternatives mentioned were only the superficial ones of location of lines and pumping stations.

Cost analyses and cost-benefit calculations should be included for all alternatives to aid in studying the alternatives. These should include adverse and beneficial environmental effects if they can be quantified. These effects should be listed even if they cannot be quantified.

Small aerobic plants for each home were not considered. They cannot be dismissed as too expensive when compared with the proposed plant. Capital expenditures for the current plant will be on the order of $10,000/home. (If the footage charges will be $2,000 - $3,000/home and if the footage charges are to represent about 20% of the total project, the approximate expenditure per home is $10,000). Aerobic plants cost less than that by about half.

Schuylkill River Quality

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The effects of the point loading of the Schuylkill River with additional phosphate and nitrate was not discussed. Will this have any effect on the shad which the Pennsylvania Fish Commission says are now starting to come up the river? Will the plant life encouraged by such fertilization have an effect on the recreational uses of the river, such as boating in the Betzwood Bridge area?

Miscellaneous

In discussing deep and shallow well disposal of effluent on page 141 the statement seems to assume that untreated waste would be injected. Well-treated wastes could be disposed of this way without degrading water supplies.

Incineration is a poor method of sludge disposal since it is expensive, uses too mucy fuel, and wastes valuable fertilizer.

There should be clarification of the reasons for dismissing land disposal of sludge. It does not appear that this was ruled out for socio-economic or for technical reasons. Sewage sludge can be used as fertilizer and should be.

WILLIAM E. SOPPER
FOREST HYDROLOGY CONSULTANT

UNICIPAL WASTEWATER DISPOSAL
MUNICIPAL WATERSHED MANAGEMENT
SPRAY IRRIGATION
SLUDGE DISPOSAL
FOREST MANAGEMENT

416 OUTER DRIVE
STATE COLLEGE
PENNSYLVANIA 16801
AREA CODE 814
466-6095

February 5, 1974

Ms. Harriet Stone
Green Valley Assoc.
Birchrunville, Pa. 19421

Dear Ms. Stone:

I have read the Environmental Impact Statement prepared by the EPA for the Valley Forge Area Wastewater Treatment Facility, Chester County, Pennsylvania. I have reviewed the document to determine whether spray irrigation (land treatment) should be considered as an alternative.

For the single plant proposed (8 mgd) about 1000 acres would be required for spray irrigation. A large contiguous block of land in that area might be difficult to obtain. It would be much easier to operate 2 or 3 smaller plants with spray irrigation, however, this does not appear to fit the regional planning concept.

It is not absolutely necessary to purchase and own the land to be used for spray irrigation. It is, of course, desirable to own and control the land use but satisfactory long-term leases are also possible. New in-plant treatment technology in the next decade may reduce some of the present fears connected with spray irrigation and land disposal.

Although it is stated on p. 130 that phosphorus and nitrogen removal are not now required by DER one should realize that these requirements will soon be coming. Phosphorus removal is now being required for some new plants in Pennsylvania. Secondary treatment will not solve water pollution (eutrophication) problems. The only total answer will be tertiary treatment.

Some of the potential adverse impacts associated with land disposal as cited on pp. 159 and 160 are erroneous. I know of no research data available to back up some of the statements. In fact, our research here at Penn State shows just the opposite.

1. There is no real evidence to indicate that land used for spray irrigation must exclude the public. For instance, our facility has been used as "open space" by the general public. It is also open for small game and deer hunting.
2. Ice accumulation from winter operations.
   a. The use of low pressure, low trajectory rotating sprinklers can keep this damage to a minimum in mixed hardwood forests. One should not even attempt to use coniferous forests for winter irrigation.

b. Winter spray irrigation does not form a continuous ice mat. It does not restrict plant food from mammals and birds. In fact, our wildlife researcher indicates that winter spray irrigation actually provided more food (bending over of brush species, etc.) for rabbits and better cover conditions. Rabbits were larger and healthier in the spray irrigated areas than in the control areas.

c. Spray irrigation in the winter is a loose configuration of ice and has little effect on ground-dwelling mammals. Natural concrete frost is more of a problem.

d. Habitat modifications. In general, it appears rabbit habitat is improved and observations on the Penn State facility indicate that deer invade the ice areas and even bed down in them.

Spray irrigation is certainly an alternative to be considered. I guess the two critical questions are (1) can the area best be serviced by one large plant or by several smaller ones? and (2) are suitable spray irrigation sites available in the vicinity of any of the existing or proposed plants? This almost becomes a specific site evaluation.

There is little else I can conclude from the information given in the Environmental Impact Statement. I hope these remarks might be useful.

Sincerely yours,

299

William E. Sopper

William E. Sopper
Professor of Forest Hydrology

WES:aab

Chester Valley Knoll Civic Association, Inc.
P.O. BOX 801
FRAZER, PA. 19355

February 9, 1974

U. S. Environmental Protection Agency
Region III -- Curtis Building
6th & Walnut Streets
Philadelphia, Pa. 19106

Re: Valley Forge Wastewater Treatment
Facility-- E.I.S.
Public Hearing-January 10th, 1974
Berwyn, Pa.

Att: Mr. Daniel Snyder
Regional Director

Gentlemen:

This statement will serve to supplement my prior oral testimony given to your Agency January 10th, 1974 in the matter above captioned.

To avoid repetition and avoid burdening the record, our Association adopts the testimony and any supportive exhibits of the following persons:

Ms. Harriet Stone representing the Green Valley Association.
Edward W. Furia, Esq., representing four named Citizen Groups.
Emanuel V. Lauria representing Citizens to Reclaim Chesterbrook.
29 Dr. Ralph Heister.

We adopt in part, a statement being submitted to you by Mr. Thomas Hagan, a citizen of East Whiteland Township and a member of our association, with respect to that part of the statement concerning statistical data involving cost factors and the like, as well as the portion of the statement that deals with the Industy vs. Resident Homeowners.

The statement submitted by the Board of Supervisors of East Whiteland Township, is to say the least self serving. It presents nothing new that is factual, but, rather seeks financial aid in serving their contractual part in the Valley Forge Regional Municipal Authority. The residents are not "obstructionists". If sewerage is re-quired by a showing of concrete need, then a viable system would be required for the entire township, not just a selected small area, which the Supervisors have deemed to be "economically feasible".

Appended to your EIS Draft is a copy of a letter dated December 26, 1972 , numbered your Exhibit 11, submitted by the Township Manager of East Whiteland Township. On Page 2 thereof, in Paragraph 3 Mr. J. Donald Reimenschneider states quote" We have sewage running down our streets". This statement in my opinion is nothing but an hysterical outburst. There is nothing on the record to indicate anything but a very minimal percentage of residents experiencing septic tank difficulties. Whether or not this condition is caused by poor tank construction, or ineffective leach fields has never been publicly determined. If we assume that "sewage is running down the streets" so to speak, the Township had the availability of the Great Valley Wastewater Company's treatment facility located in our township, to remedy this situation.

As a matter of fact, this Great Valley Wastewater Treatment Facility in East Whiteland Township has a permit allowing it to treat 0.32 mgd. The plant began operation in 1969. It serves a specific development as well as certain industries in our township. It has been issued a permit recently to allow a tie with a new apartment complex consisting of 230 units, which is now under construction. An industrial area sold to developers by the apparent owner of the Great Valley Wastewater Co., facility, has also applied to the Pennsylvania Public Utility Commission for a permit to tie in with the latter treatment facility, which we have reason to verily believe, will not be denied. Mr. C. T. Beechwood, Regional Sanitary Engineer of the Pennsylvania Department of Environmental Resources has informed me by letter January 25, 1974, that existing flows at Great Valley Wastewater Treatment facility are well below the hydraulic loading, which allowed the above stated Apartment Complex to tie-in. I have no doubt this will hold true for this new industrial development in our township. It is well known that Statistics can be molded to any situation for a given result, and, it does appear that Environmental Engineers can fit their theories and designs with a desired result. But, I do not believe the end justifies the means in the matter of the Valley Forge Regional Sewer System as related to our Township.

In summary, I do not believe there is a need for the present size of the Valley Forge Area Treatment Facility in terms of present needs, nor for the foreeable future. Our Township has an operable facility serving portions of the township, which can serve our entire township, if suitably expanded facilities are constructed to take care of township needs.

With all due respect to the Engineers involved, and the feasability studies presented, the cost factors resulting from their planning are astronomical. We believe that your Agency should give further careful study and consideration to this project in terms of viable needs and costs, giving consideration to new technologies and perhaps more effective alternatives.

Very truly yours,
Chester Valley Knoll Civic Association

Maxwell Powell
President

P.O. Box 723
Paoli, Pa. 19302
February 9, 1974

Mr. Daniel Snyder
Environmental Protection Agency
Region III
Curtis Publishing Building
Philadelphia, Pa. 19106

Draft
Environmental Impact statement
Valley Forge Wastewater Treatment

Dear Mr. Snyder:

The need for sewage treatment in Northern Chester County is obvious. It is easy to understand why a regional sewage system plan was eagerly welcomed. Resistance did not surface until fragmentary reports revealed that we are going to nurture a Frankenstein.

Even tho the Clean Streams Laws clearly mandate a drastic reduction in stream pollution, the plan presented in the draft gives this mandate only token attention. Chester County has been a basically agricultural community. The well-drained land was retained for food production; leaving the flood plains and the swamps to anyone who could put them to profitable use. Zoning regulations and land use plans wisely recognized the hazzards of developing such areas. Yet the records are filled with cases of zoning changes, simply beaause the developer asked for the change. Th this date, there is still no effective curb to this heedless exploitation.

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A regional sewage system for this area could be justified if it solved all the present sewage problems in the eight municipalities it purports to serve. Most of the communities show a reasonable cost effectiveness for sewer service, but Willistown falls woefully short. Not only does the collection system ignore large areas where septic tanks overflow onto lawns, but even worse, it doesn't concern itself with many larger systems which are discharging pollutants into streams which supply the drinking water reservoir.

Even a casual study of the Willistown system reveals a deliberate avoidance of many real problems, in favor of building a collection system which will produce the maximum number of individual hook-ups per front footage. This is not community service. This is economic skulduggery. It is dangerous, economic discrimination against the lower income portion of the community.

When even the initially revealed plans are cause for alarm, it becomes imperative that NEPA take a long, hard look at the contracts of administration and enforcement. They must become a part of the impact statement.

The plan , as presented, includes vastly oversized systems for collection, pumping and treatment. Yet the assignment of all this excess capacity is at the whim of an autocratic authority which does not answer to the people who pay. These powers are neatly locked up in a contract which is not even a part of the initiallimpact statement. It would be ironical if NEPA altruistically authorized a multi-million dollar project, only to discover later that much of this taxpayer money is serving vested interests. While at the same time, home owners who need help could be completely ignored by an authority with the power to allocate sewage service att its' own discretion. This looks like a sure invitation to endless litigation and acrimony.

Conclusions reached in the study are based on projections of readings for an agricultural community. Accelerated building drastically reduces open space, and significantly affects such considerations as :run off, foliage respiration, aquifer recharge and many other considerations which are indispensable to large scale development. An accurate impact statement must include this revised data. If NEPA approves the plans in the statement draft, before critical studies are completed, it will negate the efforts of many other agencies which are also studying the problem. It would be dangerous to arbitrarily dictate a competely different style of living for this community, without making very certain that there are adequate resources to support such accelerated growth. The impact statement must contain an accurate evaluation of the exhorbitant demands of growth upon the community resources of energy, water, fuel, transportation as well as the burden of civic administration. It must also read accurately the sociological and the economic impact upon the low and middle income group in the community which is being required the carry the burden of the cost. Some will lose their homes, and others will have to mortage substantial ammunts of future earnings to pay for this.boondoggle. The present plan does not respond to the basic needs and hopes of people who are the unfortunate victims of circumstances. It caters instead to the owners of larger tracts of ground who can profit handsomely.

If NEPA were pointed out as a powerful lobbyist for vested interests, developers and speculators, it would seriously becloud the clean image of the Environmental Protection Agency.

If the environmental protection of northern Chester County is to become a reality, the first step must be: A sewage treatment system which will effectively eliminate all present pollution of the waters of the commonwealth.

The second mission should be an accurate evaluation of a resources inventory to determine the extent to which it can support stimulated growth and its' attendant problems.

Third; it is ipperative that the local authorities with the power to change zoning and alter planning, will indeed act in the best interewts of that community. Records of past performances are a poor source of hope. NEPA would be remiss in the discharge of its' responsibility if it threw the taxpayer upon the mercy of such capriciousness.

Not until the foregoing requirements are met, should we even consider more stimulated growth. We can no longer afford to repeat the mistakes of the past. Even urban sprawl is running out of room. Unless the present impact statement draft is completely revamped and re-oriented it will FAIL in its' mission for community betterment. In its' present form it is only a tool of vested interests who would exploit and rape one of the few remaining outposts of pristine colonial heritage.

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If a regional sewage system for northern Chester County is for the benefit of the taxpayers who live there, then that system must either confine itself to the solution of all present pollution problems; or else await completion of comprehensive planning to parallel the scope of explosive land speculation and building which such a sewage system would cause.

yours truly

Harold Roeder

Harold Roeder

Thomas E. Hagan
24 Doe Lane
Malvern, Pa. 19355

February 8, 1974

Mr. John Snyder, Regional Administrator
U. S. Environmental Protection Agency, Region 3
Curtis Building, 6th and Walnut
Philadelphia, Pa. 19103

RE: VALLEY FORGE SEWER AUTHORITY

Dear Mr. Snyder:

On January 10, 1974, on behalf of the Chester Valley Knolls Civic Association, I testified at the EPA hearings and expressed opposition to the proposed Valley Forge Area Wastewater Treatment Facility. On that occasion, I suggested that once again the taxpayers were being manipulated by "some sinister force". This current White House phrase was indeed used to enliven a long and sometimes tedious hearing. But, the humor suddenly becomes "inoperative" upon sober evaluation. Sadly, the proposed regional sewer plan represents almost a total perversion of the avowed purpose of the plan, 30 and at a crushing, unbearable cost to the homeowner. If it is the role of the EPA to protect our resources, then let us utilize that most precious of resources------simple, common sense.

It is not the purpose of this statement to advocate a "no action" position. The outpouring of public opposition and indignation toward the proposed system is based on the fact that the system defies every norm of logic and credibility to an extent that almost precludes reasonable rebuttal. Our elected and appointed government officials, with very few exceptions, appear to have shown utter disdain for the concerns of the people whom they are entrusted to represent; but show total responsiveness to industry, to the land developers, and to the large land holders and speculators who will derive the major profit from the system at minimal cost to themselves. This derives from a series of gross inequities. For this reason, the people come to the EPA as the court of final appeal in what we might dub "The People versus Big Brother". Are you ready?

A limited portion of the existing residents in the Valley Forge Region are being compelled to pay 40 million dollars for obsolete sewer technology in order to destroy by incineration a variety of critically limited natural resources which derive from sewage, such as: methane gas or Methanol, one of the finest fuels available to man; and, organic fertilizers to replace the petroleum based fertilizers which are now critically scarce. The water, which is forecast to be our next catastrophic shortage, will be irrevocably pumped out of its normal watershed at a rate of 8 to 24 million gallons per day, carefully purified and then dumped into the Schuylkill River for instant recontamination.

The Regional system renders virtually the entire population totally dependent on a single outlet for the use of their toilets. Not only is the system vulnerable to mechanical failure, but Philadelphia Electric Company cannot guarantee the necessary 6.5 kw of electricity to operate it; because Philadelphia Electric has no guarantee of the fuels it requires to generate that electricity. And we think it is tough to wait in line at the gas station on odd numbered days?

The $40,000,000 system is ostensibly mandated to resolve the critical health problem resulting from overflowing residential septic systems. No factual study has yet established that the problem represents an average of more than 5 homes per hundred throughout the entire region; which could be resolved in most cases with available technology at minimal cost. In East Whiteland, as will be shown later, that represents more than $200,000 per defective septic tank, and a minimum cost to each participating homeowner of $35,978 over the life of his mortgage for use of a system he does not need, does not want, and cannot afford. Yes: The taxpayer is an endangered species.

The Draft Impact Statement devotes 9 solid pages of text in one section alone (Appendix 3) to entities ranging from Macro Invertebrates to the Tufted Titmouse. The same voluminous study devotes exactly 2 lines of text (page 236) to "the short-term negative impact" caused by front footage assessments and cost of hook-up "particularly on elderly residents with fixed incomes". With that terse phrase, "short-term negative impact", we simply write off 15 to 20 percent of the individual human beings who live, breathe, and hope for one more tomorrow in this Region. By definition, all impacts on the "elderly" are "short term": And, how does the phrase "negative impact" translate? When it describes a $3000 to $4000 compulsory assessment and expense imposed on the elderly living on meager incomes, it translates into forced sale or seizure of their homes. Are the "elderly" our "expendable species"?

305 The best information available to the people indicates that 5 percent, or less, of the homes in most townships have significant chronic problems with their septic systems, which constitute a health problem. Nor has any factual study shown quantitatively, or qualitatively, that the remaining 95 percent contribute significant pollution to our waterways. In Willistown, a detailed house-to-house survey identified a maximum of 60 homes with septic problems in a total of 1200 homes: exactly 5 percent. But, the highest concentration was in Willistown Acres, which is excluded from theregional system because of the high cost to include it. A black residential area with septic problems was also excluded for unstated reasons until the EPA took action. And, I am sure there are other such areas. Suddenly, it would appear that imminent health hazards are not the prevailing consideration at all. In our Township of East Whiteland, perhaps 50 homes out of the less than 1,000 to be sewered in the next ten years have chronic septic problems. Based on carefully estimated usage among the eight townships in the Regional system, East Whiteland is required to

assume 28 percent of the cost of the $40 million system. That is $11,200,000. Can we believe it is necessary to spend 11 million dollars to solve the septic problems of 50 homes: that would calculate to $224,000 per home. And then, our Supervisors and the Sewer Authority issue public statements that those people who question the proposed system are unreasonable obstructionists whose delaying tactics are responsible for the high cost of the sewers.

We are piously told by our government officials that we face an imminent threat of typhoid and hepatitis caused by defective septic systems. Therefore, it is imperative to spend 40 million dollars, without delay, to prevent cataclysmic disaster. I do not know how many fatalities have resulted from typhoid and hepatitis in this area. But, I do know these same government bodies require 2 or 3 fatal, or near fatal, accidents at any given intersection before they will authorize a study just to establish justification for subsequently spending $100 to install a STOP sign.

These same officials then tell us it is necessary to spend our 40 million dollars to stop pollution of our streams. And yet, the Chairman of the Chester County Commissioners operated his Knickerbocker Landfill directly adjacent to Valley Creek in open defiance of repeated Pennsylvania State citations for major violations of county and state health codes.

We are then told that Federal legislation "mandates" that we clean up our streams and waterways. That was commendable. But, the President of the United States deemed it appropriate to impound 9 BILLION dollars legally appropriated for that purpose.

We are told that the proposed system is not intended to reward or enrich the land developers or the large landholders and speculators. Then why are we required to build a system with an initial capacity 100 percent greater than present requirements, and designed for almost instant expansion to a capacity level 600 percent greater than present requirements? Is it only a coincidence that much of the remaining undeveloped land in the Chester Valley will not support highly profitable, high density development without public sewers? Is it a benign serendipity that donates such a system, prepaid by a small group of benevolent homeowners; and even complete with interceptors? Is it not strange that virtually every elected or appointed guardian of the public trust in Chester County marches forth in lock step to support building this system "with all due haste"; though many of them have decried the absurdity of the system in private discussion.

Now consider how the cost is to be born in East Whiteland. Our 28 percent share of a current 4 million gallon per day load (mgd) for the entire region would be 1,200,000 gallons per day. But, a maximum of 1,000 homes to be sewered in the township would represent no more than 350,000 gallons per day, or 29 percent of the township total. Who constitutes the other 71 percent? I believe it is primarily industry. Our government officials assure us industry is paying its fair share. By whose standards?

Government grants cover a substantial share of total system cost. Another major share must be covered by some form of preliminary assessment, with long term bonds to pay the balance of capital cost and operating cost. The entire arrangement of course is to pay for a system and plant capable of processing millions of gallons of raw sewage. But, East Whiteland and others have decided to tax or assess this money based on front foot assessment by adding a surcharge of many dollars per front foot, over and above the actual cost of laying pipe past our homes. That surcharge appears to be from $700 to $1300 per homeowner, or an average of about $1,000 per household. The total front foot assessment for a typical 80 foot lot is approximately $1500.

However, National Rolling Mills Inc. produces more sewage than 200 average households, but must pay only $360 front foot assessment on a 20 foot wide access road. Therefore, 200 average households are assessed a combined $300,000 versus $360 for NRM Inc. Very simply, the homeowner is being charged $833 for each $1 paid by National Rolling Mills for equivalent use of the system. Yes. That is an extreme example. Relative to other industrial users, the homeowner may only be paying at a rate 20 times greater, or 50 times greater.

On page 188 of the EPA Draft Impact Statement it says that industrial input to the treatment plant is estimated at less than 5 percent of the total input. In East Whiteland, a list put out by our Industrial Development Board lists 42 significant industrial and commercial companies, as of 1967. National Liberty Life Insurance Company with 1,000 employees, Lee Tire and Rubber Co., plus a large shopping center and office complex, and others have 30 arrived since. In terms of sewage load, National Rolling Mills (200 EDU), Wyeth Laboratories (286 EDU), and Burroughs Corporation (230 EDU), to list only 3 of the 42 companies recorded in 1967 nearly equal the total sewage input of all the households to be sewered in the next ten years. To provide equity, these three companies would have to pay a combined front foot assessment on more than 10 miles of sewer line. Our governing officials tell us that some slight inequity might exist, but they insist that a straight benefits assessment is not permissible. By whom? West Whiteland satisfied all the same requirements we face, and they applied a benefits assessment based on straight EDU input per user at a cost of $500 per household. They also have an annual rental of $168 per household compared to the $225 and up quoted by our townships. Will the EPA tolerate this???

The next item is annual rental. We do know, that the homeowner will be charged as much as 50 percent more than homeowners in West Whiteland. That is as much as we know. Our officials flatly

refuse to discuss or disclose any factual aspect of the rental cost per EDU to the homeowner versus industry. But, they do pat us on the head and tell us "rest assured that industry will pay its fair share-----but, we certainly are not going to overcharge them". Then they tell us that it would be unfair to charge industrial users as much as homeowners, because some industrial users have pretreatment facilities. Then they conclude by patting us on the head again and saying "Trust us.". That has to be the ultimate insult. For one thing, industrial waste must be preprocessed just to bring it to a qualitative range comparable to residential waste; at which point the cost of final processing would be the same as for residential waste. A rolling mill which processes: anodizing or alodyning for aluminum; pickling or plating for strip steel; passivating, electro polishing or chemical polishing for stainless steel. These processes generate high Ph wastewater and voluminous sludge, which must be preprocessed. I
3-7 think it is rather clear that gross inequities will apply to rental rates as well as initial assessments. I also believe the public trust is being "mortally wounded"!

We are told by the same authorities, that the cost is a bit high, but by no means prohibitive. When a friend once asked politely--"and how is your wife, Socrates?" the venerable philosopher responded: "compared with what?". As everything is relative. we must evaluate cost in some context. For example:

1. To a 35 year old homeowner supporting his family in an average home and saving frugally to provide some meager retirement income, the cost of flushing his toilet will deplete his retirement fund by a minimum of $35,978. Yes! The cost of flushing his toilet may equal the purchase price of his home. Preposterous? Not according to the Main Line bank which reviewed the tabulation marked EXHIBIT "A", attached. Please examine it. This example reflects the cost to a person who

is fortunately in a position to withdraw a conservative $3,000 assessment and hook-up expense, without the need to borrow. The cost is based on 6 percent simple interest.

2. In this next example, the homeowner faces the same expense, but finds it necessary to make an installment loan. The standard "6 percent discount" installment loan for 3 years is actually 13 percent simple interest, and for 5 years it is 15 percent. The cost of the 5 year loan is roughly 2½ times greater than used in example #1 and represents a combined loan repayment and sewer rental cost of approximately $100 per month for 5 consecutive years. If, because of the explosive inflation in the economy, this person cannot sustain these payments and is forced to refinance, the cost penalties are staggering. Remortgaging is even more disastrous.

3. This example is the case of the elderly persons living on a limited pension or social security and in daily fear of outliving their resources. To these people, an extra $100 a month expense is not even a possibility, even if they could find a bank that would grant them a loan. They have two options: One is to sell their property voluntarily and pay realtor's fees plus capital gains tax and then move into a low rental fire trap. The second option is to lose their home at Sheriff's sale. Perhaps 15 to 20 percent of the people to be sewered fall in this category. In East Whiteland alone, that would be 150 to 180 of the original 900 homes to be sewered. I consider this nothing short of confiscation at legal gunpoint. 3/10

I think these typical examples establish a meaningful reference. By coincidence, none of our Supervisors are being sewered, nor are most of the other townships' Supervisors, nor is Dr. Weinstock, nor is the eloquent Solicitor Bill Lamb, or virtually all of the others who testified in support of the proposed system. They can proclaim with detached eloquence---"the cost is a little high, but not excessive". Can you?

Finally, who were the witnesses supporting the sewer system, and those opposing it. In support of the proposed system we had Richard Fox of Chesterbrook and entourage of paid, professional witnesses. We had the bond specialist who sells sewer bonds, the engineer who did Mr. Fox's hydraulics engineering for Chesterbrook, and so forth. All were testifying as ecologists and public spirited conservationists. Does Mr. Fox always travel indiscriminately about the country, with entourage, in pursuit of clean waterways.

On the other side of the issue were all the established, recognized ecology and conservation groups, such as the 700 member Green Valleys Association led by Dr. Ralph Heister who has for several years led the most extensive conservation studies in the area, with no questionable interest to protect. Is it not odd that the recognized ecology and conservation groups testified in unison against the proposed sewer system. And why did all the Civic and citizens groups, including individuals, testify in direct opposition to their elected and appointed government officials? I wonder, but will not speculate. In short, it was amateur private citizens trying desperately to defend themselves against their designated protectors. Has "1984" arrived 10 years early?

What do we ask of the EPA? We ask that you withhold the Federal grants which dictate the implementation of this project until the following items are accomplished:

1. A total new study to establish appropriate technology at a reasonable cost.

2. A formal guarantee that grants will not be awarded to any community employing unfair assessments. All assessments must be on an equitable "benefits" basis.

3. A contractual guarantee that all developers will pay their fair share of "front end" assessments and not just rentals.

4. Provision to protect the "elderly" from loss of their property due to extreme assessments.

It is also urged that use of technology such as "spray irrigation" be considered. This can be done on long term leases utilizing existing farmland at minimal cost. Not only is this ecologically sound, but it can be structured to prevent the tax inequities which otherwise will drive the owners of farmland into the open arms of the land developers.

There is so much more that needs to be said, but every effort must terminate at some point. As a parting thought, we might do well to reflect on the compulsion of the Roman Empire to build monumental sewer systems. Their sewers survived. The Roman Empire did not.

Thank you for considering these views.

Sincerely yours,

Thomas E. Hagan

265 Friendship Drive
Paoli, Pennsylvania
February 8, 1974

Mr. Daniel J. Snyder III
Regional Administrator
U. S. Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Snyder:

The Proposed Valley Forge sewage treatment system has a number of serious consequences for the residents of Friendship Hill, located in Paoli and in the area to be served by the proposed sewers.

Results of a Poll in Friendship Hill

3. A poll taken April, 1973, of the 115 households in Friendship Hill shows that among the 64% of the homeowners that responded (all of the homes in Friendship Hill are owner occupied) 91% are not in favor of sewer installation.

In the five years prior to the poll, 47% of the respondents experienced no difficulty with their septic systems and, as a result, were expense free for that period. While 50% experienced some expense, the most frequent expense by far at 71% was to pump out the sludge with some acknowledging that pumping out was done as a preventive measure with no problem contributing to the expense.

A tabulation of the expense experienced in the previous five years resulted in an average of $78.97 per home experiencing an expense. The annual average expense per home that spent money on their septic systems was $15.79! This expense includes major repairs and replacements as a replaced septic tank, an additional cesspool and replacement of septic tank cover or baffle. The cost for the replaced septic tank was $750, a cost far lower than the cost of connecting into the proposed Valley Forge system. In addition, the continuation of a properly operating on-site septic system would also eliminate the need for the insidious, never-ending sewer rent that can be increased indefinately and is no comparison to the present nominal average annual maintenance expense of $15.79.

No Evidence of Subsurface Polution

A discussion with the most active driller of wells for potable water in Chester County reveals that at least 90% of his wells produce potable water. The remaining 10% are not potable due to high mineral content and discoloration, and not due to pollution. Also, huge amounts, in excess of five million gallons a day, of subsurface water are pumped from wells in Chester County by water utilities to supply potable water needs. We therefore submit that our on-site septic systems do not contribute to subsurface water pollution and beneficially replenish ground water that will be significantly depleted in areas of high elevation such as ours.

Present Residents are Subsidizing Future Expansion

While there are areas that need sewers because builders were allowed to build on land that would not accept water discharged from septic systems, this condition calls for localized treatment stations designed to deal with specific problem areas. Treatment stations are available today that are self-contained waste treatment plants designed to treat sewage by physical and chemical processes, many of which contribute no polutants to local streams compared to 5 to 8 percent for the proposed system. Localized collection of sewage in problem areas would eliminate the need to run expensive major trunk lines for long distances between communities. Localized systems would also place the cost of population expansion with the land developers and not on the existing residents who under the present system are heavily subsidizing expansion that in turn will bring with it additional expenses such as larger police departments, full-time fire departments and larger school systems. Our objections are not directed solely against expansion, but to the subsidation that we are being forced to bear.

We Can't Afford the System You Want to Give Us

Economies of scale held in defense of a large central sewer treatment system is a self-fulfilling argument because it forces many to be a part of a system that is a necessity for only a very few.

315 The relationship of the Environmental Protection Agency to the Valley Forge sewer project is very similar to a wealthy father-in-law who buys his son-in-law a yacht, out of concern for his daughter's well being, when the son-in-law can only afford to maintain a canoe. Please don't overburden us with your kindness! For example, due to economies of scale and to allow for future expansion you are considering an 8 million gallon a day system. Our present needs, with some additional capacity for expansion, dictate a 4 to 5 million gallon a day system. The larger plant directly affects the costs per household, in addition to the never ending sewer rent. Sewer rent is far higher than the cost of maintaining a properly operating septic system, and can increase year after year forever.

What Happens If We Have a Recession?

We would like to also point out that all of the plans presented to you are based on increasing prosperity. The costs of connecting into the Valley Forge system of $2,000 to $4,000 per household in this area and sewer rents of

$150 to $200 per year, and up, are presented by those who support, and will benefit from the Valley Forge system, as nominal. What happens to the oversized plant and the sewer rent if residents cannot afford to continue this expense? It is also important to note that most of those who judge these expenses as nominal do not live in the areas that will pay for the system.

A Surcharge For Future Users

The City of Philadelphia, that willingly supplies utilities to suburban residents, years ago set a precedent that we live under today. Suburban residents who use utilities supplied by the City of Philadelphia are charged a surcharge. The surcharge to suburban users subsidizes the cost of utilities to users in the City. By the same principle, I advocate that the cost to present residents of the proposed sewer area should be subsidized by a surcharge to future users. The surcharge to future users would equalize many inequities: (1) present residents would not continue to bear the large start-up costs and maintenance costs (2) present residents would be repaid for the costs of the excess capacity built into the system (3) those who will benefit from expansion will pay slightly more for the use of the system that made that expansion possible.

The Homeowner is Also a Part of the Environment and Needs Protection

We feel the homeowner is an integral part of the environment and should be protected by your agency. No specific tabulation has been made of the households that will experience serious financial hardship by the total costs resulting in connecting into the sewer system. A particular hardship for each homeowner is the requirement to pay many thousands of dollars a short time after the sewers have been installed. Although financing is said to be available through local banks, interest rates have soared to a prime rate of 9.5%. Federal funding does nothing to ease the burden of the personal debt to each homeowner. Is not a specific evaluation of the hardship placed on each homeowner a requisite of a comprehensive environmental evaluation? We request that such an evaluation be made.

A Less Expensive Way

3.17 Some scoff at the suggestion that all septic systems, both properly-operating and malfunctioning septic systems, plus future localized treatment plants be placed under the supervision and maintenance of the Valley Forge Sewer Authority. However, an examination of the saving is staggering. The cost per household of the 10,597 households that will be connected to the Valley Forge system at the present estimated cost of $38,875,700 is $3,669 per house. Add to this approximately $2,000 per house for connecting into the system and the capital expense per home is $5,669, plus the sewer rent and finance charges if the homeowner has to borrow.

We contend that present systems could be policed, maintained and replaced as necessary at a far lower cost by a central authority than installing the proposed Valley Forge system. Recent increases in construction costs will very likely escalate the costs to close to $50,000,000, raising the cost per sewered house to $4,718 plus the connection expenses, sewer rent and finance charges per house.

If the costs are examined only in relationship to the 279 malfunctioning septic systems, the total cost, including tie-in expenses, for correcting each malfunctioning septic tank is $255,176, excluding personal financing. We feel costs have exceeded a practical limit.

In summary, we feel the Environmental Protection Agency has a comprehensive responsibility that includes the homeowner. This responsibility will largely be met by consideration of the following:

1. Emphasize localized sewage treatment plants that are highly developed emitting tertiary treatment effluent or secondary effluent coupled with spray irrigation. Localized sewage treatment plants would eliminate the need to run main trunk lines for great distances and cost with accompanying environmental disruption. Localized plants would apply the cost among those who would benefit; namely, existing residential, commercial and industrial producers of sewage and would apply the cost of future expansion to those who would benefit from the expansion.

2. Communities, such as Friendship Hill, that have properly operating septic systems, or that can arrange for necessary repairs, should not be required to connect into the Valley Forge sewer system.

3. Provide government aid from the monies set aside for the Valley Forge project to residential, commercial and industrial producers of sewage to maintain present, properly operating sewage handling systems via the Valley Forge Sewer Authority that would supervise correction or improvement prescribed by individual on-site inspection and testing. As large as this program may appear, it would be far less expensive to initiate and maintain than the proposed Valley Forge system.

4. Provide for continuing control of sewer rent that continues

forever, and leaves an open-door to obtain increasing amounts of money from the homeowners.

5. If all else fails, don't leave us with an unnecessarily large sewer system that disregards the continuing financial burden you will be leaving with us that is unpalatable in a robust economy, and may be unsupportable in a recession.

Sincerely,

Arthur J. Price

Arthur J. Price, Secretary
Tredyffrin Civic Council
Past Director,
Friendship Hill Civic Association

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James G. Johnson

James G. Johnson, President
Friendship Hill Civic Association

Romney B. Biddulph

Romney B. Biddulph, Vice President
Tredyffrin Civic Council
Director, Friendship Hill Civic Association

Robert F. Zimmerman

Robert F. Zimmerman, Director
Friendship Hill Civic Association
Friendship Hill Representative to
Tredyffrin Civic Council

William G. McDowell

William G. McDowell, Member
Friendship Hill Civic Association

Copies to:

Robert J. Blanco, Chief, Environmental Impact Branch, Region III, E.P.A.
United States Senator Hugh Scott
State Representative Richard T. Schulze
President, Tredyffrin Civic Council
President, Friendship Hill Civic Association

(215) NI 4-9454

WILLISTOWN SEWER COMMITTEE

3 DF. N RO · MALVERN · PENNSYLVANIA 19355

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R. Nields
H. Roeder

January 12, 1974

Honorable Anna Maria Malloy, Chairman
Valley Forge Park Commission
Valley Forge, Pennsylvania, 19481

Re: Draft Environmental Impact Statement
Valley Forge Area Wastewater Treatment Facility

Dear Mrs. Malloy:

This draft statement refers on page 161 to spray irrigation of Valley Forge Park based on the letters appearing in Appendix 4, Exhibit 3, from Mr. Haws, Chester County Conservation District.

Accordingly, our Committee respectfully requests the Valley Forge Park Commission's response to this indicated activity.

Our intent to write this letter was stated during the January 10 draft statement hearing held by the Environmental Protection Agency (EPA) at Conestoga Senior High School. Specific request has been made of EPA, as to your reply, to extend the date by which information must be submitted for inclusion in the statement.

Also introduced during the hearing were your personal comments relative to this subject, per our January 8 telephone conversation, that this would be unacceptable under current conditions of park budget and size. During that conversation, discussion was predicated on the assumptions that: (a) technological means would be found to overcome the objectionable effluent content described in Dale McKelvie's article (copy attached) from the Suburban Advertiser, and (b) effluent would be restricted in volume to that produced by Valley Creek Municipalities rather than that of the entire Valley Forge Wastewater Treatment Facility.

Our comment during that hearing follows: "The significance of this query and the probable reply is the misdirection which EPA encouraged in not pursuing this question with the Commission before including it in the evaluation of alternative 3. Furthermore, it is recommended that EPA request of Mr. Haws other alternative sites upon receiving the anticipated negative reply from the Commission with an explanation for that reply."

Yours very truly,

Norman B. Nields

Norman B. Nields

✓cc: U. S. Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, Pennsylvania, 19106
Attn.: Mr. Daniel J. Snyder, III, Regional Administrator

330<

COMMONWEALTH OF PENNSYLVANIA
VALLEY FORGE STATE PARK COMMISSION
VALLEY FORGE, PENNSYLVANIA 19481

February 11, 1974

Mr. Daniel J. Snyder, III
U. S. Environmental Protection Agency
Region Three
6th & Walnut Avenues
Philadelphia, Pennsylvania 19106

Re: Valley Forge Waste Water Treatment Project
Draft - Environmental Impact Statement

Dear Mr. Snyder:

22) The above mentioned draft refers to the use of spray irrigation as a third alternative for effluent disposal. This method is discussed between pages 156 and 163 of the Impact Statement. Furthermore, a great deal of attention is directed to the use of Valley Forge State Park as a suitable area for spray irrigation.

The Valley Forge Park Commission is presently undergoing a study concerning the use of spray irrigation for certain areas of the park. We too are aware of the tremendous impact that this upcoming Bicentennial will have on this historic shrine. That was one of the reasons for persuing our own study concerning spray irrigation.

For the present no land in the park will be available for spray irrigation of any sort except to persue our study. We are presently creating various grounds within the park. Therefore, it would be quite difficult to allow any additional spray irrigation on the park grounds. After our master plan is finalized and our study is complete regarding spray irrigation, we will forward the results to you.

Sincerely,

Annamaria Malloy
ram
Annamaria Malloy, Chairman
Valley Forge Park Commission

AMM:ram

Comments on the
Environmental Impact Statement
of the
U.S. Environmental Protection Agency
on the proposed
Sewage Treatment System
at
Valley Forge, Pennsylvania

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These comments represent
the position of:
Green Valleys Association
Chesterbrook Conservancy
Committee Organized to Reclaim Chesterbrook
Willistown Ad Hoc Sewer Committee
French and Pickering Creek Conservation Trust
Sierra Club

submitted:
February 8, 1974

Edward W. Furia
Chester Springs, Pennsylvania

Parties to these Comments

These comments on the environmental impact statement on the proposed Valley Forge Sewer Authority Treatment Plant are submitted on behalf of the Green Valleys Association, the Chesterbrook Conservancy, the Committee Organized to Reclaim Chesterbrook, the Willistown Ad Hoc Sewer Committee, the French and Pickering Creek Conservation Trust and the Sierra Club. The first five are local envrionmental groups concerned with the improvement and protection of the environment within and around the area to be served by the proposed treatment plant. All five have a history of environmental activities in the area and cumulatively they represent several hundred individual members residing in the area. The Sierra Club is a national organization, well-known for its activities to preserve the environment. It was the plaintiff in the suit which led to the Supreme Court determination of the grounds on which such organizations do in fact have standing to participate in environmental suits and other actions on behalf of their members. Sierra Club v. Morton, 405 U.S. 727 (1972). The active Eastern Pennsylvania chapter of that organization has joined in these comments.

Analysis of the impact statement and preparation of these comments has been undertaken for these groups by Edward W. Furia, a lawyer and city planner and a former Regional Administrator of the U.S. Environmental Protection Agency. Mr. Furia is a resident of Chester Springs, Chester County, Pennsylvania, near the area to be served by the proposed treatment plant.

Need for Sewage Treatment

With the numerous documented cases of health hazards caused by overflowing septic systems, no responsible person can seriously question the need for better sewage treatment in these townships. We strongly urge the Environmental Protection Agency to help provide sewage treatment which will eliminate these health hazards and reduce pollution of soils, ground water and Chester County streams, but not in a way which will cause more damage than it repairs. Therefore, in spite of our support for better sewage treatment, we question the wisdom of applying the concept of regionalization to these townships; we question the sense of building a sewage treatment system twice as large as is needed and we submit that the Environmental Impact Statement (hereinafter "EIS") is seriously inadequate in dealing with these problems.

There are two separable environmental issues involved in the proposed plant. One is the provision of necessary treatment of wastewater for the development already in the area. The other is provision of 100% excess capacity in the treatment facility. While we agree in general with the need for wastewater treatment in the area, we do not agree that it is necessary to provide this vast additional capacity simply to meet the existing need. Throughout these comments it is important to focus on these two separate issues--meeting current needs vs. having excess supply create its own demand.

Alternatives to the Proposed Action

In a long discussion of a number of alternatives to various parts of the system (for example, there is an excellent discussion of various means of sludge disposal), discussion of two important alternatives is missing--there is not one word of discussion of the alternative of building a smaller plant with less excess capacity, nor is the alternative of several smaller plants within the service area discussed at all (there is brief mention of a two-plant alternative at p. 163).

The National Environmental Policy Act of 1969 (42 U.S.C. §§4321 et seq.) requires discussion of alternatives as one of five items under §4332. Further, it requires that the responsible agency "Study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." §4332. Clearly there are unresolved conflicts over the uses of available resources with this plant and the Act thus demands the most thorough kind of consideration of alternatives.

In the most recent regulations implementing NEPA, it is required that "Sufficient analysis of such alternatives and their environmental benefits, costs and risks should accompany the proposed action through the agency review process in order not to foreclose prematurely options which might enhance environmental quality or have less detrimental effects." 40 C.F.R. §1500.8(4) (1973) 32

Region III of the Environmental Protection Agency has often properly criticized highway planners for their narrow constructions of the word "alternatives." The classic example is a highway impact statement which takes the corridor as a given and discusses "alternatives" in terms of whether to go down the middle or down one of the sides of that corridor. When evaluating the proposed 3-A Expressway System in Baltimore, the Region III office repeatedly asked that broad alternatives be considered, including the alternatives of mass transit and of replanning the entire highway network. The Court of Appeals for the District of Columbia noted in NRDC v. Morton that NEPA requires a "rigorous exploration" and description of possible alternative actions, as well as an "analysis of their costs and impacts on the environment." 3 ERC 1558, at 1561 (DC Circ. 1972). In a case involving an impact statement on a highway, another court specifically required that the impact statement consider a mass transit alternative. Arlington Coalition v. Volpe, 3 ERC 1995 (4th Circ. 1972, cert.den._____U.S.______, 41 U.S.L.W. 3254 (1972)).

EPA acknowledges its duty on the second page of the impact statement:

> Irrespective of the fact that some alternatives for wastewater treatment and various identifiable environmental impacts (primary and secondary) may fall outside the explicit regulatory and enforcement authority of the EPA, NEPA mandates a full public disclosure of all

reasonable alternatives and possible environmental impacts. EIS, p. 2.

It is our position that the alternatives of a smaller plant or of several plants are perfectly "reasonable" alternatives and ones that demand consideration in any adequate impact statement. Under the circumstances they are far more "reasonable" alternatives than the use of "distoilets" in the foreseeable future and certainly they are more reasonable than the public condemnation of all the land in the proposed service area, although both of the latter "alternatives" are discussed in the statement at 149--150.

Smaller Plant

Throughout the environmental impact statement, the Environmental Protection Agency admits that the project creates high probability of uncontrolled growth which will cause great environmental damage, including air and water pollution, "unless land use controls are applied by local government."

Rather than discussing alternatives to new development in these townships, the EPA assumes that it has no choice but to base plant capacity on the maximum development possible under existing local zoning, thereby fulfilling land developers' and speculators' 325 dreams by building a sewage treatment system which will cause population in these Chester County communities to at least double. The population projections utilized are for 1985, but we all know that local zoning has proved no match for resourceful developers who can get zoning changes allowing higher density and opportunities for rapid urbanization.

We use the word "cause" in the last paragraph rather than "allow." It is time that the EPA--not just this Regional Office, but the entire Agency, for this has been a national oversight--admits what every real estate broker and speculator has known for years: sewers cause development to occur; oversize sewers cause oversize development; and the development happens faster and denser than anyone usually expects or can effectively control.

Given five areas, each with zoning to allow development and each more or less equally suited and attractive for development in terms of jobs, transportation, land values, there is no question whatsoever that if an oversize sewage treatment plant and interceptors were installed in one of them, that one would have development and growth which would outstrip the others completely.

No matter how many areas want development, EPA can frequently hold the key to which one will be developed.

It is totally unclear why EPA is apparently willing to fund a plant with double the needed capacity. The legislation authorizing grants for such plants specifies "that the size and capacity of such works relate directly to the needs to be served by such works, including sufficient reserve capacity." P.L. 92-500, §204(a)(5). There is no indication that the size of the proposed Valley Forge plant bears any relation at all to the "needs to be served by such works."

Although the legislation requires "sufficient reserve capacity," there is no indication that the reserve capacity should ever equal the needed capacity, as it would here. Moreover, it requires that "the amount of reserve capacity provided shall be approved by the Administrator on the basis of a comparison of the cost of constructing such reserves as a part of the works to be funded and the anticipated cost of providing expanded capacity at a date which such capacity will be required." P.L. 92-500, §2204(a)(5).

There is no discussion of such an economic balancing in the impact statement. In fact the only related discussion seems to be at p. 169 where a detailed discussion of the potential for plant expansion on the proposed site and on adjacent land would seem to indicate that plant expansion is totally feasible and is within the scope of the plan. If later plant expansion is feasible, there is absolutely no need to build this plant with 100% excess capacity. There is every reason not to build such excess capacity, because of the adverse effects discussed in these comments.

Regional Plant or Local?

By choosing a "regional" sewage treatment plant rather than smaller local plants at present sites of population concentration, EPA again invites uncontrolled growth. It does this first by running collectors and interceptors through completely unpopulated tracts, inviting future tie-ins by developers (the Chesterbrook tract is a good example, with the Willistown interceptor line running right over the land). The second way that a regional plant causes growth is perhaps the most self-fulfilling: when one builds a large plant with pipes radiating out like spokes from a wheel hub, economies of scale suggest that it results in getting as many users as possible to share the cost.

The only reference in the legislation to a concept such as regionalization is this:

> To the extent practicable, waste treatment management shall be on an areawide basis and provide control or treatment of all point and nonpoint sources of pollution, including in place or accumulated pollution sources. P.L. 92-500, §201(c) (1973).

The term "areawide" is not defined in the legislation, nor is it defined in the EPA regulations implementing that legislation. 40 C.F.R.§35 (1973).

Two important points are ascertainable from reading that section of the legislation, however. First, taking "areawide" in context, it seems to be contrasted to individual sources of pollution, indicating Congress's intent that water pollution not necessarily be entirely stopped at every source but that it be cleaned up by plants serving a number of such sources. Clearly several plants could be built within the proposed treatment area and still meet that criterion.

Thus under the legislation EPA is not precluded in any way from funding several smaller plants, each of which could be considered "areawide" even though serving a smaller "area" than the proposed one. There is nothing magic about the proposed size or configuration of the service area. In fact the EIS specifies that it is not a logical configuration for a service area:

> From an environmental standpoint, "regionalization" represents the treatment of wastewater originating entirely within one drainage basin...or that of more than one drainage basin whose natural drainage patterns lead to a common vortex. Consequently, the proposed project does not conform to this definition of "regionalization." EIS at 200.

Second, even assuming that the proposed service area were a logical one, the legislation only urges that "waste treatment management" should be areawide. Thus the Valley Forge Sewer Authority itself could build several smaller plants but manage them as a package and still retain the same service area, if there is some reason for doing so.

Thus there is nothing in the legislation or the regulations to preclude EPA from funding several small plants to serve the same area and this is an alternative which must be considered under NEPA.

Despite the twenty-five pages given to discussion of alternatives in the EIS, the discussion is grossly inadequate. By presenting only such unattractive alternatives as the "no-build" option (carrying with it such side-effects as hepatitis and other health hazards, according to EPA) and such ridiculous alternatives as the condemnation of all of the property in the service area, EPA has attempted to make the proposed project look good by comparison. The agency has totally failed to present two "reasonable" alternatives, and it has done precisely what the Council on Environmental Quality regulations implementing NEPA forbid--it has "foreclose(d) prematurely options which might enhance environmental quality or have less detrimental effects." 40 C.F.R. §1500.8(4) (1973). In fact the two alternatives which EPA has chosen to ignore would both enhance the environment and have less detrimental environmental effects than the proposed action.

Sewers for New Land or Old Land

If it did not matter (from an environmental, energy or socio-economic standpoint) whether development in Valley Forge were any different in impact from redevelopment in some other suburb, we would not be urging that a comparative analysis be undertaken by EPA, although NEPA would still require such an analysis.

By building over-capacity sewers in an area like Valley Forge, EPA acquiesces to land-use practices that are destroying our urban, suburban, and rural quality of life.

Americans easily grasp the long-range stupidity of slash-and-burn agriculture--the practice of clearing land by axe and fire, depleting its fertility with a few years' intensive farming, then abandoning the wreckage for a new part of the forest. But too few Americans see the analogy in the way we use land in our cities and suburbs. The practice of building on raw land, allowing the result to deteriorate for lack of maintenance and then turning to new rural land like Valley Forge is the modern analogy of slash-and-burn practices of early Americans. Whole neighborhoods in cities and suburbs have literally fallen into ruin, while on the outskirts, woods are being bulldozed and farmlands are being paved to accommodate new residents. Each cycle is sowing seeds of the next, for most raw land is being developed with little regard for long-term protection of the altered environment. 32

This system is essentially unidimensional--it is based almost entirely on economics, only lightly constrained by public policy in the form of zoning or use restrictions. Implicitly, and usually explicitly, the local land use allocation is managed so as to maximize short-term economic returns to the local taxing authority, developers, and speculators.

But this is an economics which has assigned virtually zero value to public amenities such as open space, scenery, wildlife habitat or wetlands. It is an economics which has considered the fertility of farmers' land a negligible value to be discarded, and it ignores the costs to townships of services for new families attracted by development. The promise of new tax base unfortunately has frequently resulted in doubling and tripling of taxes for old and new residents because of added costs. This is an economics which has ignored effects of development on water tables, runoff and flooding, erosion, water pollution, traffic concentrations, air pollution, noise and solid waste problems. And land use allocation by this kind of economics has contributed to a variety of urban and suburban environmental headaches, especially:

1. Sprawl, which generates greater transportation demands, with concomitantly greater costs, greater energy use and and air and water pollution.

2. Hydrologic disruption. Excessive use of paving with little regard for the character of the land being paved makes rain run off into streams instead of soaking into the ground. Besides causing downstream flooding, this interferes with replenishment of underground water tables which feed the streams during dry weather.

3. Misuse of hazardous or sensitive sites. Building structures on a flood plain invites flood damage; dense development of steep slopes invites erosion and stream siltation; unsewered development on land with high water tables invites pollution and a drinking water hazard.

4. Destructive development patterns. For example, uniform large-lot zoning tends to obliterate landscape variety--and, along with it, aesthetic diversity, wildlife habitat and some recreational and educational opportunities.

Although it is true that many townships and developers have tried to minimize the environmentally-destructive development of raw land, there is no question that it is environmentally more sound to redevelop blighted suburban or urban land than to develop land on the urban fringes.

329 We are running out of natural resources, we are running out of fuel, we are running out of energy and we are running out of clean air and water. As Mark Twain once said of land, "They ain't makin' any more of it."

If new communities are going to be developed, they will have to be developed on an entirely new basis. Old land suffering from decaying older developments must be restored and raw land must be preserved in its natural state with country streams and country air. Agricultural land must be preserved.

Inconsistency of the Proposed Action with EPA Mandate Under Clean Air Act of 1970

Under the Clean Air Act of 1970, EPA has the mandate to reduce certain air pollutants to safe levels by 1976. The purpose of the reduction to achieve "primary standards" is the protection of public health. Under the Act EPA is specifically empowered to use land-use and transportation controls to accomplish the reduction of air pollutants. §110, 42 U.S.C. §1857c-5.

Based on studies conducted by EPA and the Commonwealth of Pennsylvania, EPA has undertaken to provide "transportation strategies" for the Philadelphia region. In its initial promulgation EPA noted that a 58% reduction in carbon monoxide emissions by 1976 will be necessary for the Philadelphia region to meet the standards set as safe for the public health. 38 Federal Register 17793, July 3, 1973. In the most recent promulgation, EPA outlined specific strategies to reduce total vehicle miles traveled (VMT) in the region. Those strategies include the provision of special bus and car-pool lanes on roadways, the restriction of parking in certain areas and other vehicle restraints. 38 Federal Register 30626 and EPA handouts (11/15/73).

Another set of regulations under the Clean Air Act deal with "indirect sources" of air pollution, defined as any "facility, building, structure or installation or combination thereof, which causes or may cause mobile source activity that results in emissions of a pollutant for which there is a national standard." 38 Federal Register 29895, §52.22(b)(1)(i), October 30, 1973. Those regulations provide that every state must have a review procedure for such sources and that "No approval to construct or modify shall be granted unless the applicant shows that (a) The indirect source will not cause a violation of the control strategy which is part of the applicable plan, and (b) The indirect source will not prevent or interfere with the attainment or maintenance of a national ambient air quality standard." 38 Federal Register 28985, §52.22(4)(i), October 30, 1973.

Clearly when the current implementation plan calls for a reduction in total VMT in the air quality region to reduce carbon monoxide and hydrocarbon levels to those set as safe for human health by EPA, any facility, like this proposed sewage plant, which will encourage substantial residential development at a great distance from Center City will interfere both with that control strategy and with the attainment of air quality standards. In fact EPA admits in the statement,"There is a potential long-term secondary adverse impact on air quality due to an increase in road traffic associated with increasing developments. EIS at 217. The statement suggests that improved road systems will offer a partial solution, although the same agency has argued in other contexts that roads in fact serve as substantial generators of vehicle trips and thus cause deterioration and not improvement of vehicle trips--a fact which is recognized by EPA in the regulations cited above, since it specifically includes highways as "indirect sources" of air pollution. Finally the agency concludes wistfully, "It is hoped that the advent of more refined anti-pollution devices on cars will minimize this impact." EIS at 217. Such wishful thinking fails to meet EPA's mandate under the Clean Air Act. 330

Although admitting this potential impact from increased traffic, EPA fails to discuss the full dimensions of it and fails to discuss possible solutions, despite its duty under the Clean Air Act to clean up the air in the region by reducing automobile traffic.

Moreover, the Council on Environmental Quality's regulations implementing NEPA specifically require that the impact statement include a discussion of:

> The relationship of the proposed action to land-use plans, policies and controls for the affected area. This requires a discussion of how the proposed action may conform or conflict with the objectives and specific terms of approved or proposed Federal, State and local land use plans, policies and controls, if any, for the area affected including those developed in response to the Clean Air Act....Where a conflict or inconsistency

> exists, the statement should describe the extent to which the agency has reconciled its proposed action with the plan, policy or control, and the reasons why the agency has decided to proceed notwithstanding the absence of full reconciliation. (emphasis added) 40 C.F.R. §1500.8 (2) (1973).

There is no discussion in the impact statement of the inconsistency between providing this tremendous spur to development far from Center City and EPA's own efforts under the Clean Air Act to reduce VMT in the region and to restrict the construction of facilities which will attract mobile source activity in sufficient quantity to interfere with the attainment of primary ambient air quality standards.

If there were such a discussion, it could lead to only one logical conclusion: that the most reasonable alternative available to EPA is to fund wastewater treatment plants in remote suburban areas only to the extent that they are needed to serve existing needs with a very small reserve capacity; and to fund any excess capacity at locations in or near the hearts of cities.

Grant Conditions

It is finally important to note the conditions which accompanied the offer and acceptance of the Federal grant for the sewage works, which offer and acceptance was signed by the Valley Forge Sewer Authority and the Environmental Protection Agency on January 29, 1973. Section J of that document reads, "It is understood that this conditional grant offer shall become null and void if the Regional Administrator determines as a result of the NEPA review that the project for which this grant has been awarded is environmentally unsound. It is further understood that the need for project changes and/or the necessity for environmentally-protective measures, assurances, and regulations in connection with the project may result from the NEPA study."

This document clearly shows that both the EPA and the Valley Forge Sewer Authority contemplated that the environmental assessment and Environmental Impact Statement process could result in project changes such as a reduction in capacity and cost, or type and number of treatment plants. Indeed it contemplates that EPA could withhold funds altogether if the Regional Administrator finds that the project is environmentally unsound.

Conclusion

The Environmental Impact Statement is seriously deficient in that it totally fails to consider two "reasnnable alternatives"-- the construction of a smaller plant to serve existing needs (while providing excess capacity and thus encouraging growth at a site nearer the city); or the construction of several smaller plants to serve existing needs. Furthermore, the statement totally fails to deal with the serious potential air pollution problems that will be caused as a secondary effect of construction of the plant as proposed and it fails to resolve the inconsistency between the policy of its sewer grant section to encourage growth far from the city and the mandate of its air pollution section to clean up the air by reducing automobile travel in the region.

We urge the Environmental Protection Agency to correct the deficiencies in this impact statement by discussing the alternatives of building a smaller sewer plant or of building several smaller plants to serve existing needs. Such a revised statement should include a full discussion of the coordination between its sewer funding policies and its air pollution abatement policies and it should compare the total environmental impacts of 1) building the proposed project with vast excess capacity at a remote site and 2) building a plant to serve existing needs and providing the excess capacity at another plant in or near the city.

Such a thorough study can only show that building a smaller plant at the proposed site will abate the water and land pollution problems cited as the basis for the need for the project, but without increasing air pollution, as the present proposal would do. The alternative of providing excess capacity in or near Philadelphia is certain to show a generation of fewer VMT (both because of the shorter distance for automobile commuters and because of the greater accessibility of mass transit) and thus a smaller incidence of air pollution.

Therefore we urge that the Environmental Protection Agency, either now or after completing such a revised impact study and revised impact statement, request an amended application for funding from the Valley Forge Sewer Authority--an application which would reduce the capacity of sewage treatment to be provided for these Chester County communities.

We urge this Regional Office of the Environmental Protection Agency to take the lead in its agency and in the nation in providing a rational and planned policy for the funding of wastewater treatment plants, a policy which will abate problems of water pollution but one which will be consistent with sound land-use planning and with the agency's mandate under the Clean Air Act to reduce air pollution to safe levels. Such a consistent policy is clearly required of the agency by the Clean Air Act, by the National Environmental Policy Act and by the various regulations cited herein implementing those Acts. We urge EPA to take this opportunity to establish that policy and implement it.

HARRY O. WAGNER, P.E., PRESIDENT
JOHN B. JUNG, P.E., EXEC. VICE PRESIDENT
HAROLD L. HAMBACH, P.E., VICE PRESIDENT
RAYMOND M. BEST, P.E., VICE PRESIDENT
RUSSELL E. HORN, P.E., BOARD CHAIRMAN

BUCHART-HORN

CONSULTING ENGINEERS and PLANNERS

612 WEST MARKET STREET · YORK, PENNSYLVANIA 17405
P. O. BOX 1663 PHONE 843-5561 AREA CODE 717

January 14, 1974

Director of Public Affairs
EPA Region III
Curtis Building
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Re: Valley Forge Sewer Authority
Environmental Impact Statement
BH #713904

Gentlemen:

As Engineer for the Valley Forge Sewer Authority we are pleased to submit testimony in regard to the Draft Environmental Impact Statement covering the Valley Forge Area Wastewater Treatment Facilities. 133

We have been employed by the Valley Forge Sewer Authority since 1969 to evaluate alternative solutions to sewage problems in the Schuylkill Township, Charlestown Township and East Pikeland Township areas. We have also been authorized to prepare plans and specifications to design the facilities recommended. These include sewage collector and interceptor systems for these townships and the sub-regional wastewater treatment facility now under consideration for the entire area.

Our function as Engineers is to provide technical guidance to the Authority and to develop a practical and economically feasible project. In the development of an overall plan as well as the specific preparation of a design for construction, some of the guidelines followed by the professional are:

1. The approach to a project should be consistent with land use planning as set forth by controlling agencies.
2. The solution to the project should be achieved at minimum cost to the user.
3. The solutions to the project should be adequate to meet current environmental regulations as related to stream, air and land discharges.

OFFICES: BALTIMORE, MARYLAND CHARLESTON, WEST VIRGINIA HARRISBURG, PENNSYLVANIA LEWISBURG, PENNSYLVANIA MEMPHIS, TENNESSEE
WASHINGTON, D. C. YORK, PENNSYLVANIA

4. The design of the project should minimize negative environmental effects during construction and during operations.

5. The design should be developed around the best available technology.

6. The design of facilities should be sufficiently flexible to adapt to future requirements in capacity and in the degree of treatment without considerable over investment of current capital.

7. The designed facilities should be practical to operate and maintain.

8. The solution should recognize technological innovations in the field and make application where practical and when the owner is fully apprised and financially able to undertake potential problems of innovation.

It is our opinion that these factors have been adequately considered in the planning and decision making processes leading to the proposed action.

It should be remembered that the facilities as planned and designed have been reviewed and approved by experienced state and local planning and regulatory agencies and that by written agreement four additional competent engineering firms representing the Valley Forge Sewer Authority's partner townships and borough have also reviewed and given input to the proposed design. 331

We are aware that several alternatives have been presented to EPA for consideration including the investigation of two or more treatment plants and utilization of the spray irrigation concept.

The concept of several plants rather than one has been reviewed in the past and because of high degrees of treatment and associated costs of construction and operation the proposed plant was deemed appropriate. This facility is in the overview of the Delaware Valley, one of several sub-regional plants that would discharge to the Schuylkill River.

The spray irrigation concept has been proposed by several commenting organizations. It is agreed that recycle and reuse of waters by spraying on the land has positive value in many instances and it is a solution to wastewater disposal employed by our firm and by our associated firms in the project in many instances. Our reasons for not selecting this alternative for the Valley Forge area have been outlined in the Environmental Assessment and in the Draft Statement. We would be pleased to amplify those comments.

It is our opinion that the area in question is and has been badly in need of sewers for several years. We would hope after this year of investigation EPA would share our belief and actively assist in seeing the project move forward.

Very truly yours,

BUCHART-HORN

Raymond M. Best, P. E.
Vice President
Environmental Engineering

DLM/kau

cc: Dr. Joseph Weinstock, Chairman
Valley Forge Sewer Authority

Director, Public Affairs
E.P.A. Region III
Curtis Building
6th and Walnut Streets
Philadelphia, Pa. 19106

re: ENVIRONMENTAL IMPACT STATEMENT- VALLEY FORGE AREA WASTEWATER TREATMENT PROJECT

Comments by: CHESTER VALLEY SPORTSMEN'S ASSOCIATION
BOX 7
MALVERN, PENNSYLVANIA 19355

The Chester Valley Sportsmen's Association(CVSA) has as one of its primary concerns the environmental quality of the Valley Creek Watershed which forms most of the,"Chester Valley.

The CVSA has been very concerned with the water quality of Valley Creek and has done considerable work on quantifying some of the pollution sources (see enclosure).* While we agree there is a definite need for better treatment of effluents, residential and industrial, we do not feel that the proposed Valley Forge Wastewater Treatment Project, as proposed in the Environmental Impact Statement(EIS), is the most environmentally sound approach to the problem. Our objections and questions are listed below:

A. Safety of Treatment Plant Site and Valley Forge Pumping Station Site

The EIS states that the height of the flood waters of 1972 at the proposed treatment site attained a 93 foot elevation from a,"practical viewpoint." The previous estimate for the 100 year flood at the site was 90.2 feet elevation. The EIS fails to consider the following questions:

1. What quantity of rain did fall in the Schuylkill River Basin upstream from the treatment site during the floods of "Agnes"?

2. Did this quantity equal or approach an actual 100 year flood as an average for the entire upstream watershed ?

3. If Agnes was not an actual 100 year flood on the Schuylkill, what percentage of a 100 year flood was that storm ? The EIS fails to even approximate what elevation an actual 100 year flood would attain on the site.

4. How accurate is the,"practical viewpoint," elevation determination ? ±1 foot ? ±3 feet ?

5. What would be the effect of flooding on each of the critical portions of this treatment plant? Would it be rendered inoperable as so many were after Agnes?

How long would it be in-operable? What effect would 8 million - 20 million - 60 million gpd raw sewage have on the Schuylkill River?

6. What is the reason(s) for the error in the original calculations that determined 90.2 feet as the estimated 100 year rainfall before Agnes proved this figure incorrect?

7. What do these error factors hold for the future regarding flood levels at the treatment plant site?

8. What effect will future upstream 'development' have on run-off rates and future flood levels at the site?

The EIS discusses the Valley Forge Pumping station and cites data which appear to be contradictory and confusing.

On page 37, Pa. Department of Environmental Resources(DER) data are cited stating that the Valley Creek watershed is 21 square miles and will discharge 6,000 cfs at a 100 year flood. This data assume the watershed to be,"fully developed."

On page 41, data described as being,"calculated," lists, "Valley Creek near Schuylkill River," at a 100 year flood discharging 3,325 cfs at an elevation of 74.4 feet.

On page 214, Army Corps of Engineers data list the 1972 flood levels at the mouth of Valley Creek at 89 feet elevation. On page 215, the elevation of the, "first floor," of the Valley Forge Pumping Station is given at 78.83 feet. 337

1. The calculated elevation of 74.4 feet at a discharge of 3,325 cfs for a 100 year flood is in error. Two sources, DER and the Heister study of 1973[1] show the discharge to be in excess of 6,000 cfs and the Army Corps of Engineers data show the elevation of Valley Creek to be 89 feet in 1972. And yet the 74.4 feet figure is used in the EIS to show the 78.83 foot level of the Valley Forge Pumping Station to be safe from flooding.

2. Which figures regarding elevation are correct ?

3. Why are obviously erroneous data concerning discharge and elevation listed?

4. The DER figure of 6,000 cfs discharge for a 100 year flood assumes the watershed to be,"fully developed." Does that mean DER assumes the watershed to be,"fully developed," NOW or does it refer to a future date when it would become,"fully developed"? Since the EIS uses this

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[1] A Land-Use Model for Predicting the Environmental Impact of Future Urbanization on Valley Creek Watershed With Recommendations for Communities Within the Watershed, Conestoga Senior High School under the direction of Dr. Ralph D. Heister, Jr., March, 1973

data, one must assume EPA and the DER agree on what, "fully developed," means. What does it mean? Does it relate to the carrying capacity of the land as defined by responsible environmental standards or is it defined by the local real estate agent?

Whether or not the 6,000 cfs figure cited by the EIS relates to the Valley Creek Watershed at some future date or whether it relates to the Valley Creek Watershed as being,"fully developed," presently, the figure is incorrect and out-dated. The Heister study of 1973 shows the 100 year flood discharge to be 6,360 cfs presently without any further development and no one believes the Valley Creek Watershed has seen its last "development" even if many feel it is already over-developed. What will be the effect of future development, which EPA admits will occur, especially after sewers are provided, on the discharge of a 100 year flood twenty years hence? What will be the elevation of such a flood at the Valley Forge Pumping Station? Why isn't future development and provisions for its effects mentioned in the discussion of flooding of the Valley Forge Pumping Station location ?

5. What would be the effects of flooding on the Valley Forge Pumping Station and its ability to continue functioning?

6. If the Valley Forge Pumping Station is inundated by another Agnes and is rendered in-operable, how would it be repaired when covered by ten feet of water (Station site-78.83 foot elevation, p. 215; Army Corps of Engineers data- 89 ft. elevation at the mouth of Valley Creek, Agnes 1972, p.214) ? What happens to the sewer system if the Valley Forge Pumping Station fails for one hour? one day?

7. What would be the combined effect of a true 100 year flood (Agnes was definitely not a 100 year flood on Valley Creek and it is doubtful that Agnes was a 100 year flood on the entire upstream Schuylkill River Watershed) on the combined Valley Creek and Schuylkill River Watersheds? What elevation would be attained?

8. In referring to the elevation of 78.83 feet for the Valley Forge Pumping Station, the reference point used is the,"first floor." The earlier text describes the station as underground. Which is it?

B: Exclusion of the Primary Sewage Pollution and Enrichment Sources of Valley Creek from the Valley Forge Project Initial Service Area

The proposed Valley Forge project and the EIS which considers its effects is not satisfactory to the CVCA. A proper plan and statement is needed. That "proper" plan must include all of the major sewage sources in the Valley Creek Watershed. The present plan and EIS fail in this regard. The sewers go west in the Valley Creek Watershed only as far as the Deer Run Pumping Station. While the entirety of the Little Valley Creek watershed is sewered, only a small portion of the headwaters of "Big" Valley Creek is sewered. This headwaters area is sorely in need of coverage. This area is the primary source of sewage pollution in "Big" Valley Creek.

The enclosed report by the CVSA shows clearly that this headwaters area is polluted. Over 155,000gpd of "treated" sewage is dumped into these headwaters streams from five treatment plants. The effects of this overloading are obvious. The old State Health Department verified this in a 1969 study as did the Heister study of 1973. One tributary, carrying some 85,000 gpd of effluent from Immaculata College, is over 25% effluent during low flow. The coliforms average over 1,000 per 100 ml. Individual samples go as high as 3,000 per 100 ml. These five plants fail to do the proper job at an unknown frequency. Effluents with a pH of 3.0 and without chlorination have been detected (see CVSA report enclosed). This is a health hazard. Sewering is badly needed here.

There are only twenty malfunctioning on-site septic systems listed in the "Big" Valley Creek Watershed and only three of these are served in the proposed Initial System.

1. Why does the EIS fail to discuss this problem?

339 2. Why does the proposed treatment fail to cover this heavily over-loaded headwater? area?

3. Economic considerations are necessary but where do environmental considerations fit into the list of priorities regarding collection systems and their location?

Without inclusion of these plants, the Initial System will do nothing to improve Valley Creek's quality in five of its seven-mile length.

O. Effects on the Schuylkill River

The claim is made in the EIS that one of the immediate effects of this project is the improvement of the quality of Valley Creek and Little Valley Creek. This is true if the above-mentioned Valley Creek Treatment plants are included. However, the EIS fails to point out the total effects of degradation on the Schuylkill River.

Presently, the residential wastes are treated by on-site systems of which a large percentage are operating properly with no discharge to surface waters except by unknown amounts via ground water pollution. The "treatment" plants in the watershed discharge their "treated" effluent directly to surface waters as do the few on-site systems which are failing. The treatment of these stream contaminating wastes is, then, continued in the stream.

Considering Valley Creek as the final effluent pipe of the watershed's present total treatment system, one needs to determine the quality of this effluent (Valley Creek) and compare it against the effluent of the proposed Valley Forge Treatment Plant. Then one can adequately compare the effects on the Schuylkill River.

The EIS does not answer the following questions:

1. What % of the waste generated in the Valley Creek Watershed is presently reaching the Schuylkill River via Valley Creek?

2. Considering the various parameters used to evaluate effluents, will the 8mgd effluent from the proposed treatment plant carry more pollutants to the river than the present flow of Valley Creek ? What of French, Pickering, and other tributaries?
The proposed treatment system requires all residential and industrial wastes to be collected and guarentees these wastes will reach the Schuylkill River. Not only are the effluents from Valley Creek all being centralized in the Schuylkill River by this project but effluents from areas outside the normal Schuylkill River drainage basin are being transported into the basin from the Delaware River Basin further adding a pollutant load to the river. It assumes there is no permissable on-site treatment method which will not contaminate groundwater, tributary streams, or the river itself.

3. How much waste treatment could be absorbed by the land surfaces or sub-surfaces in Valley, Pickering, French, and other watershed areas?

4. How much would this reduce the treatment load on the treatment plant? the Schuylkill River? Reviewing the Heister Data[2] for station #1 (the mouth of Valley Creek) indicates the following discharges at low flow-25 cfs

Phosphates(ortho)	50.0	lb./day
Nitrite	0.2	"
Nitrate	250.0	"
Chloride	282.0	"

Reviewing the Heister data and unpublished CVSA data for the mouth of Valley Creek regarding micro-organisms, the following is found:

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[2] ibid., pp.18,25

	high flow period	low flow period
Total coliforms/100ml.	200-400	1,000-3,000
Fecal coliforms/100ml.	100-400	200 - 500

High flow data based on eight samples-1971
Low flow data based on two samples-1971,1972

If we assume the average microbe population of Valley Creek at its mouth, then Fecal Coliform counts are approximately 200/100ml.

The EIS discusses the requirements regarding the microbial counts on its effluents as 200/100ml. with <10% of samples > 1000/100ml. It would appear that, microbiologically, the present final effluent of the Valley Creek Watershed (Valley Creek) is comparable in quality to the proposed Valley Forge Treatment Plant.

Chemically, the EIS does not discuss, quantitatively, the expected performance of the proposed treatment plant. However, when comparing the condition of Valley Creek at low flow(15mgd) with the 8mgd first stage of the proposed treatment facilities, the following effluent qualities must be attained by the treatment plant to avoid the introduction of increased pollutant loading to the Schuylkill River:

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Phosphate(ortho)	< o.8 ppm
Nitrite	< 0.03ppm
Nitrate	< 4.16ppm
Chloride	< 4.52ppm

5. Will the proposed treatment plant attain this level of performance?

6. What is the pollutant load at the mouth of Pickering, French, and other tributaries to be sewered? Are they more or less contaminated than Valley Creek?

7. Will the above maximum discharge qualities at the proposed treatment plant exceed the equivalent loading rate by those streams?

8. Will the Schuylkill River suffer increased or decreased enrichment as a result?

9. How much extra loading results from the importation of effluent from the Ridley/Darby/Crum Creek Watersheds?

We understand that this project is planning for future growth and that further development in the Valley Creek Watershed, without the proposed project, would further deteriorate Valley Creek and probably the Schuylkill River as well. In view of the fact that the presence of sewers will assure developments in excess of what might have been permitted in their absence, the extra loading on the Schuylkill River will probably exceed that which might have occurred without the sewers. It is true that the sewers will improve the chemical and micrbiological qualities of the tributaries by by-passing them to discharge directly to the Schuylkill River. The Schuylkill will receive far more enrichment as a result, however. A responsible EIS must address itself to this problem.

10. What of future "regional" plants designed to cure the ills of other tributaries to the Schuylkill River? How will the Schuylkill handle future proliferation of these plants along its banks? The CVSA does not want any stream or river to be sacrificed for the sake of other streams. If one stream suffers, then the treatment system is a failure.

D. Inclusion of Portions of the Delaware River Basin in the Proposed Project

The CVSA objects to the EIS coverage of this area for the following reasons:

1. The inclusion of this area(Ridley, Darby, Crum Creek) because it introduces additional nutrient load (nearly 23mgd by 2020) to the Schuylkill River.

2. The key to the "economics" of this entire project appears to be this southerly area since it constitutes nearly 40% of the effluent to be processed throughout the proposed growth of the project until the year 2020. We feel there is an alternative to the inclusion of this area in the Valley Forge project which we will discuss in a later section.

The EIS does not adequately review alternatives to including this area in the Valley Forge plan. The effect of importing all of this extra effluent on the Schuylkill River is not discussed.

E. Construction Procedures

The CVSA urges the EPA to assure that all protection be afforded to the streams, trees, and soil during construction of whatever plan is adopted. Irresponsible contractor destruction during sewer installation along the Perkiomen Creek has been inspected by CVSA. There, the contractor cleared 100 feet instead of the allotted 50 feet in one area resulting in the loss of many trees and unnecessary disruption of many acres of ground. There were also instances of backfilling topsoil first with rock, which had been blasted from the bottom of the trench, left on top of the ground. We hear recent complaints in the press regarding installations along Broad Run in Chester County involving excessive destruction of trees. The CVSA is not assured by the EIS that these conditions will not occur along Valley and Little Valley Creeks. We do not want one unnecessary tree scarred or destroyed. We do not want one incident of unnecessary disruption of stream banks or channels. We want to be assured that EPA will act promptly to intercept such excesses before they occur and we want penalties for non-compliance by the contractors to be enforced. Excessive destruction has occurred in the past and present sewer projects. We want a special effort by EPA to see that this does not happen on this project.

F. Alternative Effluent Disposal - Spray Irrigation

The evaluation of spray irrigation in the EIS by EPA and their consultants Buchart-Horn is inaccurate, irresponsible and incomplete. Some of the reasons given for its unacceptability, coming from an agency that is supposed to have Federal responsibility for environmental protection, are incredible.

343 The EIS spends several paragraphs discussing the Regional Concept and how this planning commission and that basin commission support the proposed project because it is consistent with the, "planning process." It is interesting to note the inclusion of the Chester County Health Department as supporting this plan. Their support is not surprising since it is that agency which can be held responsible for many of the problems. They issued all of the permits for those now improperly operating on-site systems. The DER is also listed and they issued the permits for all the unsatisfactory package treatment plants on the headwaters of Valley and Little Valley Creeks. EPA has the final word, however, on whether or not the proposed project meets, "regional objectives." On page 139, a smaller plant with spray irrigation is described as being in direct conflict with the "regionalization" concept EPA favors.

1. Why is EPA so infatuated with the large scale approach?

2. How does the regionalization concept measure up to the "environmental concept" ?

3. How can it be environmentally more sound to dump tons of nutrients daily into the Schuylkill rather than spray irrigate with zero effluent to any surface or sub-surface water?

CVSA does not support any treatment plant directly discharging nutrient laden effluent to our surface waters. We do not support proliferation of small package plants with direct discharge to a stream or large regional plants discharging directly to a river. Small plants with spray irrigation are the answer to pollution of our surface waters. We agree that entire watersheds must be included as one 'region' when discussing waste treatment but we do not agree that several small plants with spray irrigation within one watershed plan is not a "regional" approach. EPA's stance on this question is the height of bureaucratic tyranny and is environmentally irresponsible.

Man must limit his waste discharges to the environment's ability to absorb them without degradation. The percolation test was supposed to give a measure of the ground's ability to absorb effluent from on-site sewage systems. One wonders when seeing all of the defective on-site systems whether this test is adequately designed or adequately administered. Now the proposed plan choses to funnel all the waste generated in the service area to the Schuylkill River. This results in 1300 lbs. of BOD and unspecified pounds of specific nutrients discharged daily. The EIS fails to clearly state that this rate of BOD production is the minimum produced during peak summer efficiency and that nearly 1500 lbs. BOD will be discharged during minimum winter efficiency. In the year 2000, nearly 3500 lbs. BOD will be produced daily during the winter. Nearby the Phoenixville and Oaks plants are discharging additional millions of gallons of effluent. On pp. 36-37, the EIS cites the Schuylkill River Resources Survey as stating that the Schuylkill River from Pottstown to Philadelphia is the most polluted section of the river and the proposed discharges will overwhelm the river's ability to carry wastes for more than 50% of the year. In the face of these facts, the EIS goes blithely forward supporting the regional doctrine of EPA. In fact, in the Buchart-Horn section reviewing spray irrigation, phosphorous removal is discussed. It is pointed out that a spray irrigation system would remove all nutrients including phosphorous but since the present law does not require phosphorous removal then the EIS sees this removal as costly with,"relatively little to justify its use." The OVSA suggests EPA review pp. 36-37 where the resulting degradation of an already polluted Schuylkill River is plenty of justification for phosphorous removal. 384

4. Why does the EIS choose to support a plan which meets only the minmum requirements of the law? As the leader of the nation's environmental policies, this seems to be a rather poor example to set for others not so inclined to adhere to high environmental standards. This is an especially poor position when it is that position that is used as a reason for rejecting an alternative and environmentally superior plan.

5. What does the EIS mean on page 267 where it discusses a future use of the proposed plant's effluent as spray irrigation water? It mentions this could be done if the demand for the product warranted.

6. What would be an example of a "demand" sufficient to warrant spray irrigation? Does that imply that revenue be returned to the proposed project before any demand would be 'sufficient'?

The CVSA feels that the EIS does not properly evaluate alternatives to the importation of sewage from the Ridley, Darby and Crum Creek Watersheds. Much open ground exists in the southern portions of these watersheds. The EIS does not examine availability of this land for spray irrigation which would result in less nutrient loading of the Schuylkill River Basin and may save this area's residents some of the costs of installation.

The environmental assessment prepared by Buchart-Horn and cited by the EIS is, at best, a cursory evaluation. The, "adverse impacts," listed are not documented and are in direct conflict with data available from Pennsylvania State University regarding spray irrigation.[3] The CVSA objections and questions regarding this assessment are as follows:

1. The environmental assessment leads off by mouthing the EPA doctrine of regionalization which therefore leads it to see a requirement of a single block of 1200 acres needed for spray irrigation. Our stand on the,"regional concept," has already been stated.

2. High costs are listed for land acquisition. Why aren't permanent easements and any other land use devices researched in the EIS? Why wasn't the suggestion of Marshall Haws of the Chester County Soil Conservation District regarding the use of Valley Forge Park as a spray irrigation site completely reviewed as an alternative by the EIS? Why wasn't a quantitative study made of open land and an inventory provided as to acreage and the actual financial requirements of its present owners for use as spray irrigation sites. Is the Valley Forge Park Commission in favor of some or all of the park being used in a spray irrigation plan?

3. Land used for spray irrigation would be restricted to forest and crop land and would have,"limited human use." Aren't forests and crops used by humans? Aren't open spaces needed? Won't the growth the EIS predicts for this area destroy much of the open space? These spray irrigation sites would provide permanent open spaces. As part of our waste treatment system they would be protected permanently from construction and provide recharge areas for our water table as well.

4. Ice accumulation is listed as destroying trees and denying animals food, shelter, and mobility. Excess water is listed as attracting insects and damaging tree roots. The Penn State Data referred to earlier completely refutes these Buchart-Horn statements. The results of the Penn State ten year study lists no tree damage;in fact, a photograph shows ice formations only three to four feet

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[3] "Wildlife-Spray Irrigation," Research in the College of Agriculture, Progress Report 336, pp. 11-12, Pennsylvania State University, 1973.

high having no effect on trees. Rabbits, songbirds, and deer showed no ill effects from spray irrigated tracts. In fact, the ice formations provided shelter for the rabbits and increased the rabbit-carrying capacity of the spray irrigated tracts by bending branches of brush down to where the rabbits could feed on them. At Green Valley Farm, Avondale, Pa., crops attain huge yields and no insect problems exist(cow manure is spray irrigated at Green Valley Farm).

If Buchart-Horn presumed to do an adequate study of the beneficial and adverse effects of spray irrigation without consulting Penn State University, a pioneer in the field, then their work on this subject is shoddy at best.

It is ironic that wildlife is held up as a reason for rejecting spray irrigation as a viable alternative to the proposed system when spray irrigation would actually help protect wildlife by maintaining open space. This is a particularly ironic point since later in the EIS, wildlife is listed as being eliminated due to the development accompanying the sewer installation. The EIS tersely adds that no endangered or,"unordinary," species exist in the study area. We assume that means it is acceptable to EPA that this wildlife be driven out by habitat destruction which accompanies growth. That is the same mentality that caused the "ordinary" buffalo and passenger pigeon to become quite "unordinary". 346

It appears from the completely inadequate review of the spray irrigation alternative that the EIS rejects this alternative for the most frivolous and poorly documented reasons. We request the EIS to properly address itself to the spray irrigation alternative as the only environmentally credible means of waste disposal for this project. A proper review would include:

I. Soil and open space inventory regarding possible sites in each community

II. Complete impact comparisons for both the current plan's and a spray irrigation plan's effects on the Schuylkill River.

III. Engineering studies with accurate operating and installation costs studies.

G. Land-Use Effects

The EIS includes numerous statements regarding the land-use effects of the proposed plan which are contradictory and incorrect. The general areas of those contradictions and inaccuracies are as follows:

1. There is considerable discussion regarding the relationship between sewers and development rates in the sewered areas. The EIS states in several places that growth is expected after sewering is completed: Wildlife refuges will be eliminated by the,"expected increase," in development (p.220);Kimberton Village is threatened by,"uncontrollable growth," a possible long-term secondary impact of providing sewers(P.226); Irreversible and irretrievable commitments of resources are a direct consequence of "potential" new development associated with the new sewers(p 268).

The EIS wants everyone to believe that the growth "potential" is somehow not a direct result of the sewers because the EPA has no jurisdiction over land-use. Therefore, the EIS states EPA just puts in sewers and leaves the tremendous development pressures the sewers cause in the hands of the municipalities for control and planning (page 2). This development, the EIS states, is not a result of the sewers; it's all caused by "economics"(P.261).

The controls the EIS describes are the local zoning laws and County Planning Commission review. But, says the EIS, these can fail. Any sanitary authority could extend its service area without approval if it has the money to go it alone and ~~zoning~~ zoning laws can fail as a result of political or legal pressures(p.262). Further, the EIS cites,in Appendix 1, ex. 3, page f,that," practical experience indicates that current zoning regulations will change when the sewers are available and that growth in all probability will outstrip current projections." On page 273, the EIS states the probability of,"uncontrollable development," is high because past land-use decisions in this area have been, in part, directly in contrast to land suitability. The EIS further states on page 273,"...enforcement of land-use plans and zoning ordinances have not been effective."

When one sorts out all of this bureaucratic gobbledygook it distills down to these three points:

1- The EIS states accelerated growth will occur as a result of the sewers.

2- The local municipalities, faced with the tremendous development incentive sewers provide, will be overcome by these pressures and will be forced to alter or scrap their present controls and plans.

3- Since all development has attending environmental degradation, a high rate of uncontrollable development(which is likely to occur, as EIS admits)will cause environmental degradation of the service area.

The CVSA must put the responsibility for this growth, especially the excess growth, squarely on EPA. This EIS describes a plant in 1985 with an excess capacity of 100% over current needs. By 2000, this excess capacity will be 500% with an ability to absorb 1500% over current needs. By its own admission this EIS and its authors at EPA blatantly predict this growth and yet still plan for all the excess capacity knowing the growth will very likely be uncontrolled. In fact, the design includes provisions for maximum development according to current zoning and planning controls of all farm land, unused land, or currently environmentally sensitive areas (page 5).

The CVSA asks EPA:

1. Since the EIS states the proposed project design includes provisions for maximum development under existing planning and zoning ordinances, does EPA then support these existing planning and zoning ordinances in all of the municipalities?

2. Does EPA feel that maximum development under these ordinances is environmentally responsible?

3. By designing a treatment system that, in effect, condones the existing regulations by providing treatment facilities for that rate of development aren't the answers to the above two questions, "Yes"?

CVSA feels the answer must be, "yes," and finds this EIS and the EPA condoning some fairly shoddy regulations. As an example, only two of the affected municipalities ban flood plain construction out-right. Two municipalities use the unrealistic, "50 foot rule," as defining the area adjacent to a stream where construction cannot occur. This approach is out-dated because flood plain widths vary widely and must be accurately surveyed. One municipality does not even mention the subject and three municipalities permit construction on the flood plains as long as the water will drain from the site.

By providing this huge sewer system, EPA has stripped the last really strong argument for controlling growth from the local municipalities and that is the land's ability to absorb effluents. With this factor gone, due to accessibility to sewers, other more subtle environmental concerns are much more difficult to use as regulatory tools. Now any swamp, steep hill, even flood plain in some areas, is suitable for building because the sewage will be conveniently carried away by the nearby sewer. The EIS admits this effect on page 201 where it states that sewers increase the feasible development alternatives of the land and the potential for creating an undesirable future environment in terms of land-use. The EIS states that highways and other services can cause the same, "feasible development alternatives," but the CVSA feels that sewers are the key in this situation. The Chester Valley is a prime example. Even with Rt.202, rail lines, and other services there was still the possibility of using waste disposal as a limiting factor in land use. With sewers in place, that factor is gone. On page 238, the effects of "development" on the Chester Valley aquifer recharge area are discussed. The importance of the flood plains and their role in aquifer recharge and flood water storage is related to construction on these flood plains. An irreversible loss to these recharge and storage capacities results when this construction occurs. The sewers allow this construction as a feasible option. Coupled with the lack of total bans on flood plain construction and the resulting pressures from land developers, it seems a certainty that this construction will occur. The EPA shares the responsibility for this situation with the local municipalities if this EIS is not properly altered as further discussion will suggest.

The EIS states the sewers were meant to assist local municipalities in implementing their plans where these plans called for development which was neither feasible nor practical without sewers(page 238). The CVSA wonders what kind of area and/or what kind of development was planned that sewers were needed to allow the development? Flood plains? Swamps? Hillsides? Should this EIS support a plan which encourages abuse of environmentally sensitive areas?

A. The EIS also states that other uses will become practical in areas not so previously planned and create development pressures for non-conforming uses. In this way, sewers can work to defeat the plans they were designed to encourage (page 238).

The arguments that the EIS presents excusing EPA from all responsibility for excess and uncontrolled growth are evasive and confusing. But, some of the arguments the EIS presents as the positive effects of the proposed plan regarding land-use are absolutely incredible. The following are some of these points:

> The proposed sewer system will accelerate population growth and result in developments being close together. By combining the services of several communities into one system considerable savings can be realized
>
> a. reduced operating cost
> b. easy assimilation of industrial wastes
> c. improved effluent quality due to permanent operators
> d. cheaper hook-up of new demands for sewer service due to planning for expansion of capacity
> e. expanded cultural and social services -colleges, libraries, etc.
> f. better use of highways, mass transit
> g. attraction of industry which provides jobs and improves tax bases

These points are one of the largest doses of unadulterated drivel one could expect to hear coming from an ENVIRONMENTAL PROTECTION agency. What this EIS is presenting as beneficial socio-economic factors is the same line the P.R. men from the Chamber of Commerce used which brought our urban areas to the disasterous environmental, social, and economic situation many find themselves in today.

Do the EIS and the EPA mean to say:

1- concentrations of people in urbanized areas do not cause increases in
    a) air pollution?
    b) crime?
    c) demands for social services which outstrip revenues?
    d) destruction of open space and wildlife ?

2- that the utilization of excess capacity of over-designed public facilities such as highways, mass transit, even sewers, justifies artificially inflated local populations?

3- that a small treatment plant of 4 mgd operating at 85% BOD removal is environmentally more degrading than a 60 mgd plant operating at 95% BOD removal ?

4- that a municipality can make a tax "profit" just by attracting more industry and more people?

It would appear that this EIS is stating just these points and the CVSA must object most vehemently. The environmental aftermath of all the growth attending the proposed plan clearly outweighs the immediate and short-lived financial benefits.

SUMMARY

The CVSA objects to the proposed EIS and requests revision of the following points as specifically delineated in the above text:

1. Clarification of our questions regarding the safety of the proposed treatment plant site and the proposed site of the Valley Forge Pumping Station relative to flooding.

2. Inclusion of the five treatment plants and any other significant source of stream pollution found in the headwater area of 'Big' Valley Creek in the initial service area.

3. Revision of statements regarding impacts on the Schuylkill River to reflect the true pollutant load of the currently proposed plan and its quantitative effects on the Schuylkill River, present and future. A comparison of the currently proposed plan and a spray irrigation plan as they would affect the Schuylkill River.

51 4. Inclusion of alternative methods of waste treatment for Ridley, Darby and Crum Creek Watersheds within their own watershed area (including cost and environmental effectiveness).

5. Proper evaluation of spray irrigation as an alternative treatment method with quantitative evaluations of:

   a. available sites
   b. cost effectiveness
   c. environmental impact
   d. land-use

6. Assignment of proper responsibility for effects on land-use patterns and intensities directly to the proposed plan. Comparison of land-use effects resulting from the currently proposed plan and a spray irrigation plan.

The CVSA feels the present EIS is poorly written, inadequately documented, and environmentally inferior. The proposed plan is a death sentence to the open space, wildlife, municipal planning, water and air quality, and quality of life in the Chester Valley and potentially in the entire Potential Service Area.

Jerry Bullock

Jerry Bullock, President
Chester Valley Sportsmen's
Association
Box 7
Malvern, Pa. 19355

Bob Blanco

PAD

Feb. 6, 1974

Dear Mr. Snyder,

I am a resident of Schuylkill Township, and I am concerned. I am concerned because I have finished reading the EPA report on the proposed sewage system for our area. I assumed that the persons elected to the various governing bodies in our township would have written in support of a sewage system. Anyone who is familiar with the Schuylkill Elementary knows that this township has a sewage problem. Yet, I did not find a letter of this nature from either the township supervisors or the Phoenixville Area School Board.

The problem has existed for a number of years. Numerous complaints have been made to the Chester County Health Board. One reason given for the lack of some corrective action has been the fact that the school board is waiting for sewers. From all available information, I would conclude that the wait will continue for several years.

On Jan. 31. I spoke to Mr. Donatoni. He pointed out that the township is responsible for land usage. He also said that serious health problems could result from the existing conditions. I do feel it is imperative that this type of information should receive as much publicity as Mr. Furia's comments have. Our land is developed, and we do have problems. 352

Yours truly,
Barbara Wilson
Mrs. J.Anderson Wilson
45 Flintlock Lane
Schuylkill Township
Phoenixville, Pa.

APPENDIX C

Response to Written Comments Submitted and Oral Testimony Presented at the Public Hearing of January 10, 1974

NOTE: Minor comments, corrections, additions or deletions submitted by reviewers and determined to be of significant assistance have been incorporated in the Final EIS. Consequently several of these type comments may not appear in the comment/response section.

1. Chester Valley Knoll Civic Association, Inc.

Comment:

The Great Valley Wastewater Treatment Facility in East Whiteland Township has a permit to treat 0.32 MGD of sewage. It is now operating well below hydraulic loading capacity and with suitable expansion should be able to handle all the sewage needs of the Township.

Response:

The Great Valley Wastewater Treatment Facility is a private utility company which has a DER permit to treat 325,000 gpd of sewage. The plant and receiving stream are of insufficient capacity to service the entire township. The service area of the plant generally includes Springmill Farms, Volpi Industrial Park, Rouse Company Industrial Park, National Liberty Insurance Company, Westgate Apartments, Valley Creek Village and some 40 to 60 other homes adjacent to the sewered areas. This service area is in the valley or over the ridge from the proposed Authority system. A pump station must be constructed to lift the sewage about 150 feet for connection to the proposed system. Efforts are being made to eliminate the Great Valley Wastewater Treatment Plant and have the sewage discharged into the proposed system. The capital cost for this addition to the proposed system is small as compared to the benefit of reducing the annual sewer rental by increasing the EDU base.

2. U.S. Department of Agriculture

Comment:

Recognize the impact which the construction of sewers will have on aesthetically pleasing areas under Section IV.C.

Response:

This has been incorporated in the Final EIS.

Comment:

What is the feasibility of using Valley Forge State Park for effluent disposal?

Response:

In a letter from the Park Commission dated February 11, 1974, it was indicated that the Park, for the present, would not be available for spray irrigation although the Park Commission is conducting its own study to determine the feasibility of using the Park land for effluent disposal in the future.

3. Pennsylvania Game Commission

Comment:

Include red squirrel and wood duck as game species.

Response:

This has been noted. A more extensive and detailed listing has been incorporated in Appendix 3.

4. U.S. Department of Commerce

Comment:

Ozonation should be discussed as an alternative to chlorination as a means for disinfecting the effluent.

Response:

Ozonation of municipal secondary effluents is slowly becoming a favorable means of disinfecting sewage effluents and may offer many advantages over the use of chlorine. However, its usage to date has primarily been on a small scale basis. There is a lack of plant scale experience using this process which leaves doubt as to its reliability and costs under operational conditions. Laboratory practices have resulted in proof that ozonation displays advantages over chlorination in providing a degree of tertiary treatment, removal of suspended solids, ease of operation and in providing an effluent which is safe to the receiving stream. Again, these are lab results and not based on a full scale application.

Ozonation is currently being studied by EPA as a means of waste water disinfection and effluent polishing. It is likely that chlorination will continue to be the most commonly used process for disinfecting municipal waste water effluents until chlorine supply shortages or economies of scale favor ozonation.

Comment:

Conversion of ammonia nitrogen to nitrates/nitrites will provide a nitrogen source to the receiving stream that could produce eutrophic conditions.

Response:

Presently, nitrogen removal is not requried by the State and probably will not be for some time to come. Phosphorus removal is not required at this time and DER has indicated that future removal requirements are doubtful. The design of the treatment plant is such that it can be readily adapted to meet this requirement.

Nitrification, being a function of the proposed plant, will convert ammonia nitrogen to a nitrate form, a non-oxygen demanding compound. The presence of nitrates and phosphates in sufficient quantity under essentially stagnant conditions will create algal blooms. However, the Schuylkill River, even under low flow conditions will provide sufficient dilution and flushing action to eliminate this possibility.

Comment:

Modification to the construction schedule so as to minimize effects on aquatic biota during the spring and summer months.

Response:

Pennsylvania DER's "Implementation Plan and Regulation Dealing with Erosion and Sedimentation Control" provides strict controls for mitigating those temporary adverse effects anticipated during construction. By law, the contractor's proposed construction schedule must be submitted to both the Soil Conservation Service and the many disciplined offices of DER for approval. These agencies have assured this office that they inspect the schedules closely and suggest changes based on similar reasons stated in this comment.

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EPA shares this concern but anticipates that the inspection teams assigned during construction will make every possible effort to ensure adherence of the "Implementation Plan" by the contractor and impacts, due to construction, are kept to a minimum.

5. DRBC

Comment:

The proposed project's contribution to the adverse impacts on the Schuylkill River Watershed should be addressed relative to the cumulative effect of other wastewater discharges and sources of pollution.

Response:

A discussion on this aspect has been added to Section IV.C. of the Final EIS under "Impacts on Water Quality".

Comment:

Examine further the areas where the proposed project will promote undesirable development and indicate those impacts to water resources which may result.

Response :

A land use evaluation has been made to incorporate this and similar aspects relative to the proposed action's impact on land use. The Final EIS has been revised to reflect this addition.

6. Pennsylvania Fish Commission

Comment:

All sewer lines should be kept at least 25 feet from the stream bank of any stream.

Response:

Within the limits of practical design, pipelines are kept as far from stream banks as possible. Where lines encroach closer in a parallel course by necessity, the specifications provide for protection of the stream in accordance with state regulations.

Crossing of streams, while minimized, is a necessity in many instances and these crossings are designed in accordance with state regulations and have been given separate "stream crossing permits" on the project.

One of the most significant sewer and interceptor systems in the project is that of Tredyffrin Township. The location of these lines have been reviewed in the field by that township's engineer and the Pennsylvania Fish Commission. Adjustments in lines were made as a result of the Commission's suggestions.

All profile plans have been reviewed by DER and given permits. All projects will be required to comply with erosion and sedimentation control regulations.

7. Montgomery County Planning Commission

Comment:

There is no map comparing the Initial Service Area with the Design Service Area.

Response:

Plate 3 denotes the initial sewer system relative to the Design Service Area and Potentially Serviceable Area.

Comment:

Section II.I. (Land Use) of the Draft EIS should have provided a comparative analysis of the planning efforts in the service areas to the proposed sewage facilities plan.

Response:

The intention of this Section was not to analyze existing Land Use plans vs. the proposed sewer system but to merely present a summarization of the current status of municipal planning in the Townships and Borough. However, this information was used to evaluate the anticipated impacts on land use as a result of the implementation of the proposed action (IV.C. "Environmental Impact of the Proposed Action").

Comment:

Discussions on housing should present information on supply and demand by type.

Response:

Updated information regarding housing supply and demand by type has been gathered and used in the evaluation of growth effects resulting from the implementation of the proposed project. (III. "Distributions and Projections of Population and Economic Activities").

Comment:

Concern over the desirability of future growth and a more direct evaluation of the economic benefits of the sewer system.

Response:

The sections of the EIS concerning socio-economic and land use impacts have incorporated such discussions. (IV.C. "Environmental Impact, of the Proposed Action").

Comment:

PECO has stated that power will be furnished if it is available. Is this contingent upon completion of the Limerick facility?

Response:

The Philadelphia Electric Company was contacted by the applicant at EPA's request on April 10, 1974 in relation to power supply for the projects. PECO stated that power will be available immediately upon demand and is not contingent upon the completion of the Limerick facility. A letter of confirmation to that effect is forthcoming from the power company.

8. East Whiteland Township

Comment:

Table 1 of page 12 (Draft EIS) is obviously incomplete when compared with Table 9 on page 40.

Response:

Table 1 on page 12 does not list Domestic Treatment Plants such as Treatment Plants for apartments (C.N. Agnew Apt., William Henry Apt., etc.); thus the discrepancy between the 2 tables.

Comment:

The largest aquifer in Chester County passes beneath the Knickerbocker Landfill and this landfill operation should be discontinued as rapidly as feasible in order to protect this large drinking water source.

Response:

Knickerbocker Sanitary Landfill is now operating satisfactorily according to DER, Norristown Office. They received their permit in 1973. They operate on an asphalt type membrane and no contaminants reach the groundwater. They have a leachate collection contract with Rollins-Purle (N-J) who specializes in treating hazardous wastes, therefore they do not have a leachate problem.

9. Department of Housing and Urban Development

Comment :

A response is necessary to clarify the issues raised by the Montgomery County Planning Commission concerning the project's inconsistency with overall water quality management and good regional planning.

Response:

This claim by the MCPC was referred to the Delaware Valley Regional Planning Commission for consideration since they had been approached by MCPC in 1971 on the same subject.

At EPA's request, DVRPC answered this comment in a letter of April 24, 1974. Essentially, DVRPC stated that they had not reached the same conclusion as MCPC based upon the facts contained in its review and on its water pollution control plan. The letter continues by stating that DVRPC held a public hearing in July, 1970 on the proposal and subsequently the plan was amended to add the facility. Montgomery County voted for the Plan Amendment.

When the collection system for the Valley Forge facility was reviewed by DVRPC in 1973, Montgomery County voted to find the project consistent with regional planning at the Technical Advisory Committee, Planning Coordinating Committee and Board meetings. It therefore appears that their position on the Valley Forge project may have changed since their original opposition.

Comment:

Respond to the issues raised by the Phoenixville Area Retailers Association concerning the degree to which Chester County and its municipalities are committed to the Philadelphia Metropolitan Area's "Regional Land Use Plan".

Response:

Again, DVRPC was consulted and provided the following response. DVRPC certainly recognizes the value of a comprehensive plan but cannot endorse holding up wastewater treatment grants to those counties without one.

Presently, Chester County is developing such a plan under an Urban Planning Assistance Program Contract with HUD. The regional planning agency has been informed that one of the goals of Chester County's land use plan will be the rejuvenation of the older urban areas. It is DVRPC's position that the proposed facility is consistent with that goal.

The planning agency, for reasons of clarity, have also indicated that their role in the A-95 review process is to comment on project consistency with regional planning and not on the implementation of the regional plan by county government. Quoting "Plan implementation is more a local municipal function than a County function, since the County governments have limited land use impact and no controls. Chester County cannot adopt zoning of any nature for those municipalities which have local zoning, since it has no legislative authority to do so."

Comment:

Discussion of the "Chesterbrook" housing development proposed for the Chester Valley should include responses to the issues raised by concerned organization (Chesterbrook Conservancy) regarding preservation of historic sites in the developed area and protection of the State Park from future development pressures.

Response:

The EIS has been revised to include a more detailed evaluation of land use and growth impacts on the service areas. The protection of environmentally sensitive areas such as the State Park and its immediate surrounding areas are of major concern to EPA. Consequently the EIS has discussed and identified those measures that should be adopted by the local municipalities in order to preserve and/or protect these areas. It is the responsibility of the local governing bodies to implement these measures to avoid or minimize the possibilities of future environmental degradation.

However, pending before the Conservation Committee of the Pennsylvania House of Representatives is a bill entitled "Natural, Scenic, and Historic Areas Act" (Bill No. 2134). The Act would include, among other areas to be protected, "surrounding areas necessary to preserve" specific areas, including Federal and State parks and historic areas. Such areas would be designated by DER, and would be subject to public hearings. In such areas, no development would be permitted without a DER permit and there would be public hearings on all permit applications, with the right to appeal to the Environmental Hearing Board.

In addition to this, two other bills have been recommended to the House Conservation Committee by a special House sub-committee calling for state acquisition of the Chesterbrook tract. The two bills were introduced in the fall of 1973. One bill would provide $6 million to Chester County to help with the purchase of the 865 acre site as a county park. The second bill would provide $15 million to the Pennsylvania Historical and Museum Commission to add Chesterbrook to Valley Forge State Park. 360

As of July 12, 1974, the author of the two bills, Representative Richard Schulze, Tredyffrin, hoped for quick action on the bills by the committee in order that at least one of the bills might be submitted to the House for "prompt action".

In view of the above developments, it was decided that the information regarding Chesterbrook and discussed in the Draft EIS would be omitted from the Final EIS. However, certain conclusions and recommendations regarding the Chesterbrook issue have been addressed in this EIS and can be found under the appropriate section.

10. Pennsylvania Department of Environmental Resources

Comment:

The Draft EIS should focus more attention on the environmental impacts of the proposed action, especially the relation between the existing land use plans and the layout of the proposed sewer system.

Response:

In addition to the information provided by Pennsylvania DER, highly qualified land use experts were consulted to concentrate our efforts on expanding the discussions relative to environmental impacts of the proposed project. Intensive studies were conducted and the sections reflecting anticipated impacts in the Draft EIS (particularly Land Use Impacts) have been rewritten to display a greater amount of focus to environmental problems considered to be of primary concern.

Comment:

Valley Forge State Park is very questionable as a spray irrigation site due to existing slope and soil conditions.

Response:

See comment/response for similar subject under U.S. Department of Agriculture.

Comment:

The proposed "Chesterbrook" development is by far the most extensive development proposed in the Design Service Area. Whether this project is approved is dependent upon the local municipality. If the entire project is approved it will require public sewerage facilities serviced by the Valley Forge project. However, the environmental impact of Chesterbrook is being evaluated separately from the Valley Forge project.

Response:

Although the Chesterbrook issue is a responsible decision of the local municipality, if built, it will be serviced eventually by the proposed sewer system. The availability of a readibly accessible intercepting sewer proposed to be routed through the tract makes this possible. Since this is the case, EPA feels obligated to discuss and cursorily evaluate the effects of such a development. However, since the Cehsterbrook development is not necessarily dependent on the sewer system for its approval and construction, the developers need only secure the appropriate Federal and state discharge permits.

It has been determined by this Agency, via intensive land use investigation for the service area, that the location of Chesterbrook is one which must be serviced by sewers because of the nature of the soil, groundwater and geologic conditions. If sewer service is not made available to the homes, buildings, offices, etc., planned for this area, it is likely that severe water quality degradation will accompany the life of this or any other development in this area.

Again, it is emphasized that the issue of whether or not the Chesterbrook development should or should not be constructed is a decision that falls squarely upon the shoulders of the local municipality.

Comment:

The Mason-Dixon Plan is presented in the Draft EIS as a means of supplying Chester County with water. This is a very controversial issue. By giving it this kind of exposure, the Draft EIS is implicitly endorsing the plan.

Response:

By no means is the EIS or EPA endorsing the Mason-Dixon Plan. The purpose of its inclusion in the EIS was merely to present one particular alternative scheme for solving future water supply problems for Chester County. The plan as presented in the EIS is taken directly from Chester County's 1969 "Water Supply Sketch Plan". It is solely the position of the Planning Commission and not necessarily the position of EPA. The Draft EIS did not intend to imply either approval or disapproval of this particular plan but to simply present this scheme as one of the several possible alternatives favored by the Chester County Planning Commission.

Comment:

All rock drilling machinery must be equipped with either an integral water or exhaust ventilation dust suppression device and shall be operated and maintained in proper working order.

Provide for appropriate audiometric testing program where noise levels exceed permissible standards.

Register all lasers used and report any injury resulting from their use.

Response:

These requirements appear in the specs and will be complied with by the contractors during construction.

Comment:

Confined space entry provisions (manholes, wet wells, etc.) must be in accordance with Department regulations.

Response:

Regarding confined spaces and safety, the design and specifications provide features that comply with state and Federal regulations. During the preparation of the operation manual, which is done during construction, the municipalities will submit a copy of procedures for confined space entry.

Comment:

Investigate the feasibility of including an alarm for combustible gases.

Response:

The feasibility of including fixed detection devices and alarms for combustible gases at pump stations is a good point that will be investigated. Portable gas detection devices are under consideration. A detection and alarm device for chlorine facilities is provided at the plant.

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Comment:

Pumping stations and chlorine rooms must contain provisions for adequate mechanical ventilation.

Response

Adequate ventilation at pump stations and in chlorine rooms has been provided in accordance with Pennsylvania DER guidelines and EPA guidelines.

Comment:

Emergency respiratory protective equipment must be provided for chlorination areas.

Response:

Self-contained respiratory breathing apparatus is provided for chlorine facilities at the treatment plant and either self-contained apparatus or approved gas masks will be provided for pump stations utilizing chlorine.

Response:

Self-contained respiratory breathing appratus is provided for chlorine facilities at the treatment plant and either self-contained apparatus or approved gas masks will be provided for pump stations utlizing chlorine.

Comment:

Internal combustion units for emergency generators should be properly vented.

Response:

Internal combustion engines for emergency generators in pump stations have adequate ventilation where installed in a confined space. Several of the larger stations have the engine generators located outdoors in light of this situation.

Comment:

What provisions have been made to control dust exposures due to the handling of solid materials associated with process operations.

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Response:

At the treatment facility, as designed, dust exposure problems are anticipated to be minimal. The normal mode of dewatering sludge employs heat treatment plus centrifugation. No lime or other dusty chemical use is anticipated. In the future, it is possible that this problem could develop if chemical treatment is employed as an operational change related to increased treatment requirements. At that time, the problem would be addressed.

Comment:

The study entitled "Hydrologic Study of the Valley Creek at Valley Forge State Park" by DER, presents flood discharges for the Valley Creek at existing and developed conditions. Design discharges were computed to be 7,100 c.f.s. for existing conditions and 10,800 c.f.s. for developed conditions of the watershed. The figures are higher than the 6,000 c.f.s. for fully developed conditions as presented in the Draft EIS. The report also concludes that urbanization of the Valley Creek Watershed would cause more frequent and greater severity of flooding at Washington's Headquarters.

Response:

The EIS stands corrected due to the updated flow information. The consulting engineers responsible for design of the treatment plant and pumping stations have used this information to recompute creek flood flows (100 year). The figures presented in Table 10 and Table 30 (Draft EIS) have been changed to reflect these new flood elevations and flows. As a result of this information, the Valley Creek Pump Station(elevation 78.83 - ground level) has been redesigned to consider a watertight access to the station (see comment/response to Sportsman's Association).

In regard to the flooding effects on Washington's Headquarters and other Park facilities, EPA has utilized available information to reach certain conclusions that are presented in the Final EIS.

11. Willistown Township Board of Supervisors

Comment:

3 Table 15 should be amended to reflect appropriate developer for areas W-1 and W-6.

Response:

The EIS has made a note of this correction.

Comment:

The Potentially Serviceable Area shown for Willistown Township is far too extensive to be applicable to the discussion on pages 5 and 6 of the Draft EIS. None of the area south of Jaffrey and Spring Roads has received design considerations for service at any time...either at present or in the foreseeable future.

Response:

Certainly not all the areas outlined on the Plates or in the text in regards to the Potentially Serviceable Area are accurate since this area was chosen primarily on the basis of drainage basins in the project area and what areas were thought to be logically serviceable. Recognizing the possibility that other areas denoted as "Potentially Serviceable" may be inaccurate, the wording on page 5 of the EIS has been changed to reflect this.

Comment:

A quantitative comparison of past and present stream quality in the service area may be helpful in describing the actual degree of water quality problems in the area streams.

Response:

Granted, such a comparison would be helpful, however, it is believed that the accumulative information via charts, maps, tables and text in regards to water quality is quite sufficient for the average layman to comprehend the degree of water quality degradation in the project area.

Comment:

There are inconsistancies in the Draft EIS in regards to total project costs associated with East Whiteland and Easttown Townships and Malvern Boro.

Response:

As a result of time delays and continued inflationary trends in the economy, the financial data in the Draft EIS reflects estimated total project costs as submitted to EPA by the individual applicants in their original grant applications and similar, but not precisely, the same values as submitted to C. C. Collings & Company, Inc., for purposes of ascertaining the overall costs of the combined projects. This is the primary reason for the inconsistencies.

However, the Final EIS has included up to date financial data as prepared by the municipalities and submitted to C.C. Collings for new cost evaluations. These are believed to be consistent.

Comment:

The Final EIS should present up to date financial data reflecting 75% federal funding for sewage collection systems as provided by PL 92-500.

Response:

The Final EIS has been revised to include estimated user charges to reflect 75% federal funding of the actual costs of the construction of the sewage collection systems for the participating municipalities. However, the actual user charges cannot be determined until construction contracts are awarded which would reflect actual construction costs. See "Summary" in Final EIS for a more thorough discussion of collector sewer funding.

12. Green Valleys Association

Comment:

EPA must insist upon some controls upon the rate of growth as a result of the sewer system and to insure that the capacity of the plant is not reached before the 1985 design year.

Response:

EPA will not endorse any action until this Agency is relatively assured that the protection of environmentally sensitive areas will be a planning goal of the municipalities. A proposed action (and alternatives to it) is evaluated on the basis of its beneficial effects and its relationship with the existing environment. Much work remains to be done to identify specific areas where an action should not allow the generation of growth. Conditions can certainly be applied in the approval of project grant awards when particular circumstances warrant it. Recommendations have been made by this Agency in hopes of providing guidance to local municipalities for land use planning with consideration to environmental constraints and the protection of natural resources.

Land use plans and controls are rights of local municipalities and are necessary for the development/non-development in unsewered areas as well as sewered areas.

The Pennsylvania Department of Environmental Resources has issued permits for the treatment facility and sewer lines to serve presently developed areas. Additional permits for sewer extensions will be required before the entire Design Service Area can be sewered. Areas denoted as environmentally sensitive will provide DER with essential information when exercising its discretion under the Clean Streams Law, and its duty under Article I, Section 27 of the Pennsylvania Constitution, to deny permits for the extension of service into such areas. The Department will also consider the denial of connections to existing sewers through such areas.

Comment:

The alternative of utilizing small aerobic plants for each home should be considered.

Response:

The alternative to waste disposal via individual aerobic plants was dismissed as being impractical due to inherent problems associated with its reliability, efficiency, control and maintenance, and its difficulty in treating non-uniform loadings.

Comment:

Discuss the point loading effect on the Schuylkill River from additional sources of phosphate and nitrate.

Response:

See response to similar question by the U.S. Department of Commerce.

Comment:

What will be the effect on the groundwater levels in the Kimberton area in Schuylkill Township if the sewer system is implemented?

Response:

At the request of EPA, the Valley Forge Sewer Authority contracted the firm of Todd Giddings and Associates, Consulting Hydrogeologists, to study and report on the anticipated effect on groundwater levels in the Kimberton area as a result of the implementation of the project.

The conclusions reached in the study were based on field investigations and a review of 5 pertinent reports prepared by the Pennsylvania Geological Survey on the ground water resources in southeastern Pennsylvania. 36

In summary the conclusions reached were:

1. Field observations of stream flow in seven small tributary streams and of water in fourteen upland ponds indicate the presence of a shallow water table throughout much of this area. No evidence was found of declining regional water table levels.
2. Data from studies in similar areas of Pennsylvania and field observations of local watershed conditions were used to estimate that at least 6" of water per year becomes ground water recharge.
3. Measurements on photo revised topographical maps and field observations in the area show that the population density within one mile of Kimberton is 0.25 families per acre.
4. It the total daily use of ground water of 350 gallons per day per family were diverted from this area, this would remove only 1.18" per acre per year from the area.

5. Exportation of ground water from the area as sewage flow will not critically affect the availability of ground water in this area.

6. Hydrologic conditions underlying bed rock aquifers are the limiting factors on local well yield and on the reliable availability of ground water.

7. Published studies and field evidence indicates that the proposed sewer project will not have a significant effect on the availability of ground water in this area.

The five (5) reports used in this evaluation were:

1. "Ground Water Resources of Montgomery County, Pa."

   Pa. Bureau of topographical, geological survey
   Water Resources Bulletin W-29

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2. Geology & Hydrology of the Stockton Formation in Southeastern Pennsylvania

   Pa. topographical & geological survey
   Water Resources Bulletin W-14

3. Ground Water in Southeastern Pennsylvania

   Pa. geological survey
   Water Resources Bulletin W-2

4. Ground Water Resources of the Brunswick Formation in Montgomery and Berk Counties

   Pa. Geological Survey
   Water Resources Bulletin W-22

5. Hydrology of the Metamorphic & Igneous Formations of Central Chester County, Pennsylvania

   Pa. Geological Survey
   Water Resources Bulletin W-25

Comment:

What are the reasons for excluding the Spring City and Phoenixville STP's in the proposed system and why are many package treatment plants, discharging pollutants in the headwaters of the streams, not included?

Response:

It is not an entirely accurate statement to say that these plants have been eliminated from the proposed action. Capacity in the trunks and the plant has been considered for these facilities. Each of these plants has a permit from the State of Pennsylvania and when the State requires the owners' of these plants to abandon their facilities and hook up to the regional system, it will be done. Suitable financing must then be arranged that will not have an adverse financial impact on the current users. It is not within the power of EPA or the Sewer Authorities to force these abandonments at this time. There is no disagreement with the written point but it should be realized that the proposed action is not necessarily a final action.

The possibility of taking Phoenixville and Spring City into the proposed action was considered. In addition, the possibility of combining with the Montgomery County Oaks plant was explored. The latter case is described in the EIS. Scheduling of projects and unresolvable differences of opinion precluded Phoenixville's participation at the point of decision in this action. Spring City and other points upstream were beyond the study area. Again the proposed action does not preclude the possibility of a future arrangement. In order for these "larger" plants to tie into the proposed system, it would necessitate a DER mandate to specifically require these plants to hook up.

Comment:

With the probable chance of further development upstream of the treatment plant site, there is fear that the margin of safety in regards to flooding is not large enough.

Response:

The plant was designed and located such that its operation would not be adversely affected by a 100 year flood.

The U.S. Corps of Engineers provided a 100-year flood elevation of 89 feet at the confluence of the Valley Creek and the Schuylkill River. Further, they gave a 100-year flood elevation of 97 feet at the confluence of the Pickering Creek and the Schuylkill River. The designed 100-year flood elevation of 90.2 feet was established using sound hydrological computations based on existing data. With the short reach between the two known points by the Corps, it was concluded that elevation was accurate.

Within 24 hours of Flood Agnes, a party of surveyors from Buchart-Horn visisted the treatment plant site and several pump station sites with accurate instruments. Per instructions, they measured remaining identifiable high water marks from a known USGS elevation. At the sewage treatment plant site, the peak elevation was determined at 93.0 feet. Accuracy of this measurement is within 1 foot.

This elevation is above the Corps' 100-year information. Therefore, it was concluded that Agnes in fact was in excess of the 100-year flood. To the best of our knowledge, the Corps of Engineers information is the only usable data on flood elevations in that reach.

The statement in your comment that an assumption was made on our part that flooding would not increase in the future is totally inaccurate. The "key" parts of the plant are 5.5 to 8.3 feet above Agnes and the 100-year flood respectively. This is a factor of safety against a future unrecorded flood, whether caused by excessive rainfall or caused by increased runoff due to upstream development.

Comment:

The concept of spray irrigation should be evaluated as an alternative to effluent disposal. Areas in Kimberton and Willistown have generally good sites on which to spray localized effluent.

Response:

A cost comparison of alternatives, including the evaluation of the spray irrigation concept, appears in the Final EIS under the alternative section.

Comment:

The Draft EIS is incorrect in many statements on the effects of spray irrigation. A letter from Dr. William Sopper is attached to our comments which will correct these statements.

Response:

The comments from Professor Sopper on ice accumulation associated with spray irrigation operations are well taken. The Final EIS has been revised to reflect Dr. Soppers comments.

Comment:

Sludge disposal techniques should be more thoroughly addressed, especially in regards to land application.

Response:

The Final EIS has been revised to reflect an updated position on the disposal of sludge. (See proposed action and alternative section).

13. Mr. Harold Roeder

Comment:

The proposed service area for the Willistown area is not the most cost-effective solution and ignores servicing areas where septic tanks overflow and where larger systems such as industries are discharging pollutants into streams that supply drinking water reservoirs.

Response:

A letter dated February 8, 1972 from the Willistown Township Municipal Authority to the Pennsylvania Department of Environmental Resources provide the reasons why other areas in the Township were not included in the Design Service Area of the Valley Forge system. This letter appears in Appendix 2 as Exhibit 1.

In regards to the alleged systems discharging pollutants into the streams within the Crum Creek Drainage Basin, Pennsylvania DER in a 1973 report indicated that there were no institutional, commercial industrial or domestic treatment facilities operating in a non-satisfactory manner.

Comment:

The treatment system for Willistown Township is not the most cost-effective means of providing sewer service.

Response:

Cost comparative evaluations were conducted on three alternative schemes for servicing Willistown Township, in addition to the several alternatives evaluated for the entire project which are found under the alternative section of the Final EIS.

Specifically for Willistown, however, the following schemes were considered:

Scheme I - The proposed action with Willistown at 1 MGD. Grants were figured at 75% of the project cost with an assumption of 90% eligibility (assuming collector sewer funding).

Scheme II - Willistown Township constructs tertiary treatment facilities to meet "drinking water quality" effluent and discharges to Crum Creek at 1 MGD capacity. EPA funding 75%.

Scheme III - Township constructs secondary facilities in the Township and spray irrigates the effluent at 1 MGD capacity. EPA funding 75% annual costs were calculated based on 1,542 EDU's

Scheme I -	$91/year
Scheme II -	204/year
Scheme III -	180/year

Scheme II reflects very high operational costs to achieve the degree of treatment necessary to discharge to Crum Creek. Scheme III reflects the cost of land plus a secondary treatment plant with associated operating cost. Scheme I reflects the economy of scale plus the less restrictive treatment requirements at the Schuylkill River.

The above estimates are only estimates based on updated construction costs and the possibility of EPA funding 75% of the costs. From the figures presented it is evident that the proposed action is cost effective for Willistown.

14. Barbara Garner (Philadelphia Conservationists, Inc.)

Comment:

Concern over the proposed location of a force main and gravity sewers paralleling the Darby Creek and planned to pass through and traverse the Sharp's Woods Nature Reserve in order to service the Daylesford Area of Easttown Township. Relocation is requested.

Response:

EPA requested that Yerke's Associates, Inc., meet with you to discuss the matter urging relocation if possible to minimize the impacts on the Nature Reserve. The Final EIS has been revised to include a discussion on this problem and the results of the subsequent agreement.

15. Mr. Arthur J. Price

Comment:

EPA should provide to existing commercial, residential and industrial contributors of sewage, through and under the supervision of the Valley Forge Sewer Authority, a proportionate amount of the grant award for the purposes of maintaining present operating sewage handling systems.

Response:

Under the statutory regulations in effect when the grant offer was made and under existing legislation, EPA is authorized only to assist in the funding of publicly owned treatment works and not in the subsidization of institutional, commercial, industrial or privately owned facilities or in their operation and maintenance costs.

Comment:

The homeowner is an integral part of the environment and should be protected by your agency. What are the hardships expected to be on the homeowner as a result of this project?

Response:

The burdens of homeowners have not been ignored, but instead have been carefully calculated by the financial adviser C.C. Collings & Company, Inc., whose reports have been included in both the Draft and Final EIS. That firm had advised the Joint Sewer Board that the estimted rentals and assessments, as set forth in its report, are not prohibitively high for new sewage construction projects in Pennsylvania under current conditions.

There is only one sense in which the existing users are subsidizing the future, and that is they are "carrying" the debt until new users are connected. This is true in any public utility project, but it must be borne in mind that during the initial years the present residents will also be benefitting from the project and should pay for such use. Later, as new users start to pay sewer rentals, some surpluses should be generated, which will permit redemption of bonds prior to their stated maturities. This will benefit all users equitably.

Achieving a surcharge for future users could be done under the Pennsylvania Municipality Authorities Act although it is being done in the present projects to only a very limited extent. To project any substantial increase in users would increase greatly the total amount of money that would ultimtely have to be paid as interest over the life of the bond issue. Such increase in interest would be caused by two separate factors. First, more of the debt would be outstanding for a longer period, thus lengthening the "average life" of the bond issues. Second, the projecting of substantial growth in revenues for financing purposes, would hinder the marketability of the Bonds, because it would create a risk of having to raise rates if the growth did not materialize. In summary, projecting of growth for financing purposes would raise the rates of interest on the Bonds and increase user costs.

In regards to the hardships on the homeowners to be serviced by the proposed facility, the Socio-Economic section of the Final EIS addresses this point in more detail.

375 In response to the concern over "front foot" assessment charges, this type of assessment is a traditional method of recovering part of the cost of various types of public improvements benefitting landowners. Use of them has the effect of holding down the amount of annual rentals.

The economic hardship resulting from these assessments on the individual is certainly recognized. In the event that the municipalities receive collector sewer funding for which they have applied, the monies could be used to lower the "front footage" assessments in order to reduce the bond issues. Actually, the money could be used by the municipalities in anyway they feel is best for the community.

Another method that could be employed to reduce the "front foot" assessments (with or without collector sewer money) would be to adopt policies permitting payment of assessments in equal annual installments over a five year period, as permitted by applicable law. This is commonly done, and under applicable law the interest payable to the authorities on the unpaid balance may not exceed 6% (not 9.5% as Mr. Price suggests).

Still another way of combatting front foot charges, is to impose substantial tapping fees instead of assessments, or to assess for only a portion of the cost which might be recovered through front-foot assessments. Tapping fees can be graduated in amount based upon the classifications related to the magnitude of the use expected by different types of users. Certain limitations and problems associated with a tapping fee method could result in a poor choice of alternatives.

All decisions as to whether front foot assessments or tapping fees will be imposed, the amount of them, and the extent of deferral of payment permitted, will be under the control of the governing bodies in the individual municipalities. Any concern over this matter should be directed to the governing body of the municipality. EPA or DER has no statutory authority to fix rates or demand they be changed.

Comment:

Request that EPA or some other governmental agency exercidse regulatory control over sewer rates.

Response:

There is no statutory authority for either EPA or DER to control sewer rates. Authority to fix rates is vested in the governing bodies of the various municipalities, whose representatives have been elected by the very homeowners upon whom the sewer rents are imposed. EPA does have the authority to review and approve equitable user charge systems for those areas assisted by construction grant funds. However, the user charges, as construed by P.L. 92-500 are much more narrowly defined than what the home-owner would perceive them to be. These user charges relate to the costs of operation and maintenance of the treatment system but do not relate to items such as front footage assessments, which, by and large, are capital oriented.

As an additional protection, these projects, being publicly owned, are not designed to produce a profit, and hence the rates will be fixed at an amount merely sufficient for operating costs and debt service on the bonds, and some small additional factor as a "margin of safety" to protect against fluctuation in revenues. A final protection against any possibility of unfair rates is the use of outside engineers, who must certify for financing purposes as to the collectibility of the rates imposed.

Offsetting any hardships to homeowners from the charges discussed above will be the substantial benefits from having public sewers. Even those who do not have malfunctioning on-site systems now, may have a neighbor whose malfunctioning system is a nuisance or a health hazard. Very substantial financial benefits will also accrue to the homeowners. The convenience of public sewers will be translated into a substantial increase in the market value of their homes. While it is hoped that very few elderly homeowners will be forced to sell as a result of this project, people in upper age brackets are closer to the day when, for other reasons they may wish to sell. Therefore, they are closer to realizing the financial gain implicit in the installation of sewers. Meanwhile, if they have extra land, they can sell some of that, again at higher prices because of the sewers being available. However, people on fixed incomes might find it burdensome to live in the present, i.e., until such time as they opt or are forced to relinquish their property. Although it may not be feasible within the institutional structure in the area, senior citizens might be given some type of property tax break supported by the rest of the populous.

Recently brought to our attention is a Pennsylvania House Bill No. 2361 introduced on May 28, 1974 which would provide for... "sewer rent assistance to certain senior citizens with limited incomes: establishing uniform standards and qualifications for eligibility to receive assistance; and imposing duties upon the Department of Revenue, and making an appropriation". Although its present status is now known, it may prove quite beneficial to those who may qualify for such assistance and deserves careful watching.

Comment:

Communities such as Friendship Hill that have properly operating septic systems, or that can arrange for necessary repairs, should not be required to connect into the Valley Forge sewer system.

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Response:

As indicated on the Township Map included in the EIS in Appendix 2 Exhibit 3, even though the reproduction is poor, the Friendship Hills area, according to recent data and information, has experienced failures with its on-site facilities. A more recent survey of septic tank pumping indicates that approximately 32% of the homes in the Friendship Hills area have had their on-site facilities pumped, thus confirming the definite need for sewers to alleviate this problem. This is in accordance with the Township's engineers' investigation.

16. Mr. Thomas E. Hagan. (please see C/R to Mr. Price's comments covering similar question).

Comment

EPA should require that a total new study be conducted to establish appropriate technology at a reasonable cost.

Response

The simple fact that undertaking such a study would create such a time delay, the water quality problems and the existing public health hazard would severely worsen. Certainly, the ability of the presently designed system to adapt readily to new technologies or more stringent effluent quality requirements has been taken into account. With the chance of additional federal funding due to the PL 92-500 provisions for collection systems, the proposed system, from a cost standpoint, is considered to be quite reasonable, financially.

Comment:

There is no guarantee from the Philadelphia Electric Company for the necessary power to operate the proposed system.

Response:

See similar question and response under comments submitted by the Montgomery County Planning Commission.

Comment:

The EIS does not adequately discuss the negative impacts caused by front foot assessments and cost of hookups on elderly residents with fixed incomes.

Response:

There is simply no way that the amount of assessments or sewer rentals can be reduced for elderly residents, under existing law. EPA does not possess the authority to control, for better or worse, the sewer rates within individual municipalities or authorities. EPA does possess the authority to review and approve equitable user charge systems for those areas assisted by construction grant funds. However, the user charges, as construed in PL 92-500, are much more narrowly defined than what the home-owner would perceive them to be. These user charges are related to the costs of operation and maintenance of the treatment system and do not relate to items such as front foot assessments, which, by and large, are capital oriented and the sole responsibility of the individual municipality to regulate these costs. (See similar C/R under Mr. Price's comments).

Comment:

Grant awards should not be made to any community employing unfair assessments. All assessments must be on an equitable "benfits" basis.

Response:

An assessment payable on a front-foot basis by an industry which has a large discharge of sewage or industrial waste may appear to be unfairly low in relation to a homeowner with a large rural lot. As suggested, to impose charges on all property via a "benefit" method rather than a front-foot method would require proceedings before a jury of view, if the landowner requests them, much the same as those involved in condemnation of property.

A legal response was solicited in regards to this matter claiming that historically in Pennsylvania the proceeds from this type of assessment (benefit) have not constituted financially feasible security for sewer assessment bond issues. This is so due to the uncertainty created as to the amount which may ultimately be awarded by a jury of view and the time such award may be made. Utilizing the benefit assessment approach for all the properties involved in the system would be a most cumbersome undertaking as well as being a more costly approach due to the involvement of appraisers and legal fees.

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However, this Agency has been assured that benefit assessments will be used on all cases where legally possible and practicable to avoid inequities. It is strongly recommended that alternative means of assessment charges (e.g., tapping fees, combination of front-foot and tapping fees) be brought to the immediate attention of those local officials, within the individual municipalities, burdened with such a responsibility.

Comment:

A guarantee should be obtained requiring all developers to pay their fair share of front-end assessments.

Response:

Most of the subdivision ordinances of the municipalities require developers to install sewer collectors, along with roads and curbs, all at their expense. Also, the authorities require a developer to pay the full cost of bringing service to his development from the end of existing lines. It is felt that these measures will result in equitable assessment charges. However, as it is understood under Pennsylvania law, there is no way a "front foot" assessment can be imposed except where the local government itself installs the sewers adjacent to the property assessed. A tapping fee could be imposed on the developer if the amount of it gave him credit for the cost of construction performed by him under the above mentioned provisions of a subdivision ordinance. In addition, Pennsylvania law requires public meetings be held by local governmental bodies before binding municipal decisions can be made. This fact, in conjunction with those previously mentioned, seemingly constitutes substantial assurance against undue advantage being given to real estate developers.

Comment:

The concept of spray irrigation should be seriously considered in this evaluation.

Response:

See the alternative section of this EIS which incorporates such an evaluation.

17. Edward W. Furia

Comment:

There is no indication that the size of the proposed Valley Forge plants bears any relation at all to the "needs to be served by such works" as called for by Section 204(a)(5) of P.L. 92-500.

Response:

The plant, as proposed, has a capacity of 8 mgd which was established by each participating municipality submitting their requirements to the Valley Forge Sewer Authority. Each municipality established its own needs based on current and future population figures obtained from local and regional sources.

At the time the project was being planned in 1970-1971, it was estimated that when hook-ups were completed, the initial flow from existing users would be about 4 mgd. This then left a reserve capacity for planned growth of 4 mgd It was estimated that by 1985-1987 the plant would be at design load. Because of delays, it is now estimated that the initial flows will be on the order of 5 to 6 mgd. Therefore, it is not accurate to describe the reserve as being 100%. The full load date is still estimated at 1985-1987.

In accordance with PL 92-500 Section 204(a)(5), the size and capacity of these works relate directly to the needs to be served, including sufficient reserve capacity. This has been established by EPA in its review of population and growth of the area.

EPA's findings have shown that at time of initial hook-up of the proposed facility, a reserve capacity between 2 and 3 mgd will be available to the communities for additional growth. Substantiation of necessary tie-ins and natural growth patterns for the participating municipalities has been verified and allow for the 8 mgd capacity to be realized by 1985-87.

The cost differential of waiting until 1985 to construct an additional 2 mgd's of capacity, based on the inflationary effects of 1% per month which have affected this project for the past few years and which are expected to continue, would contradict sound engineering practices and cause a greater economic burden upon the communities at that future date.

With regard to the "needs" of the communities vis-a-vis future growth, the land use agreement set forth in Appendix A requires in Section 4 that the land use plans and controls be "responsive to local and regional needs and . . . protective of all existing environmental values" (emphasis added). Accordingly, the reserve capacity will be serving future needs determined according to new environmentally sound standards.

Comment:

Request evaluations of smaller (capacity) plant alternative and the alternative of several small plants within the contributing watersheds to service existing needs.

Response:

The alternative section of the EIS has been expanded to incorporate such evaluations.

Comment:

There is inadequate discussions of the impact on air quality as a result of increased traffic stemming from increased growth in the service area. EPA has the mandate to reduce air pollution under the Clean Air Act of 1970.

Response:

Since the preparation of the Draft EIS, available data has been collected and used in the analysis of air quality impacts which has been incorporated under the appropriate section in the Final EIS. (V.C., "Impacts on Air Quality").

18. Chester Valley Sportsman's Association (CVSA)

Comment:

In regards to flood waters of the Schuylkill River and the effect on the treatment plant site and Valley Creek Pump Station, what quantity of rain fell in the Schuylkill River Basin upstream of the proposed plant site during the "Agnes" floods and did this quantity approach a 100 year flood?

Response:

Recent information obtained from the Corps of Engineers in regards to rainfall data during the "Agnes floods show:

Upper Schuylkill Basin	12"
Port Clinton (Confluence of Little Schuylkill and West Branch of Schuylkill River)	9"
Reading	9"
Birdsborough	8"
Pottstown	6"

Data from these storms is still being compiled by the U.S. Geological Survey and the Corps of Engineers for purposes of preparing mathmatical models which will compute the frequency by these events.

Preliminary information is quite variable at this time but do approximate flood frequencies for the confluence of Perkiomen Creek and the Schuylkill River at Graterford to be a 33 year flood and the Schuylkill River at Pottstown to be a 150 year flood. Also, at the confluence of the Tulpehocken Creek and the Schuylkill at Reading, the approximate flood frequency was a 100 year flood.

Comment:

How accurate are the flood elevations presented in the EIS?

Response:

Accuracy of measurements taken after the storm were about ± 1 foot. Accuracy of design mapping is however ± 6 inches.

Comment:

What would be the effect of flooding on each of the critical portions of the treatment plant and would the plant be inoperable?

Response:

393 If a flood far in excess of those designed for were encountered, it is possible that certain of the plant facilities would be rendered inoperable. If such a flood had the same relationship as Agnes did to the existing plants in Pennsylvania, most would be back in satisfactory operation within a few days to a week. Complete rehabilitation could be considered longer. This is based on available information and actual experience during flood Agnes.

The effect of a raw sewage discharge on the river of 8 - 20 - 60 MGD would depend on the stream flow at the time. At high flows, such as flood, short and long term impacts of a municipal sewage discharge on the stream would be minimal with the exception of potential public health problems relating to water supplies.

At low stream flows, a raw discharge of significant quantity would have a potentially damaging short term effect to certain fish life as well as represent a public health threat.

Precautionary designs against such an occurence have been taken. The degree of design precautions would be greater _if_ the sewage flow were _60_ MGD since the impact would be greater.

Comment:

What effect will future upstream development have on run-off rates and future flood levels at the site?

Response:

It is difficult to quantify the actual flooding levels anticipated due to future development upstream of the proposed treatment plant. Certainly, given time, resources, land use plans, zoning ordinances etc., a good estimation could be computed. It is very likely that future upstream development could increase runoff and future flood levels. However, good development practices considering storm runoff factors and provisions for erosion control, retention basins, and storm water impoundments could mitigate any adverse effects. In the design of the proposed facility, allowances have been made in regards to possible higher flood elevations.

In addition, EPA has specifically required municipalities to participate in the Federal Flood Insurance Program which would reduce the likelihood of flood loss and enhances environmental protection. (See Section III.F. "Federal and State Environmental Controls".)

Comment:

The Draft EIS cites data on flood elevations and flow quantities affecting the safety of the Valley Forge Pump Station which appear to be contradictory and confusing. Which figures regarding elevation are correct? Why is there erroneous data concerning discharge and elevation listed? Also, what flow figures for Valley Creek correctly reflect existing and fully developed conditions?

Response:

It is agreed that some of the data did appear contradictory. At one point in the Draft EIS, it was stated that Valley Creek discharges 6,000 c.f.s. at 100 year flood conditions. At another point the Draft indicates that flood elevations at Valley Creek near the Schuylkill River were computed utilizing a peak flow of 3,325 c.f.s. and the elevation at the pump station would be 74.4 feet.

In comments received from the Pennsylvania Department of Environmental Resources, they have indicated that their recent "Hydrological Study of Valley Creek at Valley Forge State Park" shows discharges of Valley Creek to be 7,100 cfs for existing conditions and 10,800 cfs for fully developed conditions. Fully developed conditions in the DER study was based on the assumption of 12% impervious cover as opposed to the estimated current 2% impervious cover in the watershed.

As a result of this new information, elevations at creek flood flow (100 year) conditions have been recomputed using 10,800 cfs as the accepted 100 year flood flow. Consequently the maximum elevation has been revised from 74.4 to 77.6 feet. Appropriately, these corrections have been made part of the Final EIS.

The simultaneous occurrence of two peaks is far beyond the concept of a 100 year condition. A practical example of this concept is the 1972 storm conditions. Referring to the Green Valley Association comments of January 10, 1974, it was pointed out that during the flood of 1972 the rainfall in the lower parts of the Delaware/Schuylkill Basin were about as follows:

Reading	6.49 in.
Coatesville	3.75 in.
Phoenixville	3.23 in.

The rainfall in Berks and Schuylkill Counties accounted for the high elevation at the subject confluence. Valley Creek was backed up at that point. Had the heavier rainfall occurred in the lower basin only, including the creek, the elevation at the subject point would have been lower.

Comment:

Five treatment plants located in the headwaters of 'Big' Valley Creek are sources of stream pollution and should be included in the initial service area. 385

Response:

The treatment plants referred to as polluting the headwaters of Valley Creek are found in East Whiteland Township. The Township's sewering program has been divided into several phases due to financial limitations of the Township. The Design Service Area relating to East Whiteland on Plate 3 of the EIS represents the first phase of that Township's sewer program. There are active plans to complete subsequent programs into the Study Area.

Regarding the five named treatment plants in connection with East Whiteland's program:

1. Great Valley Waste Water Plant

   It is planned to phase out this facility and connect to the system in the first phase.

2. Great Valley High School

   It is planned to connect this facility by way of the Great Valley Plant if suitable financial arrangements can be made. If not, this facility will be connected in a subsequent phase.

3. Fern Trail Court

This facility is beyond the Design Study Area on Plate 3 and is not currently in East Whiteland's phased planning. It is recognized that this facility should be served. The reason it is not is that the cost of serving this unit should be the owner's responsibility, not the Township's. The Department of Environmental Resources could and possibly should dictate the elimination of that facility. Then the owner could make the necessary financial arrangements with the Township to have it accomplished. There is sufficient reserve in the sewer design to accomodate the discharge from this facility.

4. Ed Morelli Apts.

The same situation as (3) exists with the apratments. However, there is an active plan to provide sewer extensions into this area in a subsequent phase.

5. Immaculata College

The same situation as (3) is true of the college.

The statement: "Economic considerations are necessary but where do environmental considerations fit into the list of priorities regarding collection systems and their location," points up a dilemma that must be recognized by those who rightfully would like the removal of all significant pollution in one step.

Regarding feasibility, the Townships are responsible to the public users who will bear costs. Private owners of substantial facilities must bear their own costs. When these private users are in an area where public sewers are extended for public need, they are in a financially advantageous position to connect as compared to the private facility distinct from justifiable public sewers.

All of the five plants could connect immediately if the private users wish to bear the cost or are made to bear the cost. The Townships under current law would be irresponsible to their constituents if they were to bear the cost of expanding into areas to benefit private users only.

Comment:

What is the quality of the effluent flowing via Valley Creek to the Schuylkill River and what % of waste generated in the watershed is presently reaching the River?

Comment:

If the Valley Creek Pump Station is at foot elevation 78.83 and the Army Corps of Engineers data in the EIS shows a flood elevation of 89 feet, wouldn't the pump station be completely under water during another Agnes flood?

Response:

The comment is viewed as quite appropriate and one that has been questioned by this Agency also. The apparent discrepancy between the flood elevations of 77.6 (or originally 74.4) feet and 89 feet is the result of analyzing two flood conditions. The 89 feet is based on Corps of Engineers data for a flood on the Schuylkill River. The design engineer, based on field observations immediately after the 1972 flood, feels that the elevation at the confluence (Valley Creek and Schuylkill River) was closer to 90 or 91 feet.

387 Certainly the elevation of the pump station will not withstand the 100 year flood of the Schuylkill River. At one time the elevation of the Valley Creek Pump Station was proposed to be higher for safety purposes but was reduced during the design process to eliminate visibility and thus the aesthetic impact from the view of Valley Forge State Park. Consequently, the pump station has been redesigned to include watertight seals protecting mechanical/electrical equipment. However, current plans are to leave the key elevation of design (approximately 79 feet) as is. It should be noted that this is a comparitively minor pump station serving a small residential area just north west of the Park. It's failure would not create significant adverse effects on the system or streams for the period it may be inoperative.

Comment:

What would be the combined effect of a true 100 year flood on the combined Valley Creek and Schuylkill River Watersheds? What elevation would be attained?

Response:

To calculate a quantative answer to this question would be nearly an impossible task because of the host of parameters involved.

The Valley Creek flood elevations are based on the concept that flood flows resulting from that drainage basin will not occur at the same time as a flood in the Schuylkill River.

Response:

From the information presented in the EIS and the information submitted by CVSA, it is clear that the quality of Valley Creek as it reaches the Schuylkill River is very poor and heavily polluted. The source of this pollution is from both below standard package plants and malfunctioning septic tanks. An exact quantification for percentages of wastes generated is a difficult task to achieve especially in light of the timetable for this project. It is certainly anticipated that the proposed sewer system will alleviate the source of pollution form failing septic tanks and many package plants. Of course, it is hoped and encouraged that DER will increase monitoring and enforcement of existing and planned package plants to ensure that the headwaters of the Valley Creek Watershed are of quality consistent with the results of the sewer system downstream.

Comment:

When the proposed 8 MGD treatment plant is discharging at full capacity to the River will the pland carry more pollutants to the River than the present flow of Valley Creek?

Response:

See comment/response to similar questions by U.S. Department of Interior, U.S. Department of Commerce and the revised section in the Final EIS on "Impacts on Water Quality". 744

Comment:

How much waste treatment could be absorbed by the land surfaces or sub-surfaces in Valley, Pickering, French, and other watershed areas?

Response:

Regarding sub-surface disposal, it is evident from existing conditions that current on-lot disposal systems of the area in general are unable to cope with existing quantities. The soils are generally poor in percolation or they are shallow and underlain with fissured limestone. The concept of spray irrigation as a means of effluent disposal is and will be studied for implementation capabilities. Thorough studies must be conducted before land treatment methods can be utilized with assurance on a scale of this size.

Comment:

The Draft EIS does not discuss quantitatively the expected performance of the proposed treatment plant. To avoid introducing increased pollutants to the Schuylkill River the following effluent qualities must be attained:

Phosphate < 0.8 ppm
Nitrite < 0.03 ppm
Nitrate < 4.16 ppm
Chloride < 4.52 ppm

Response:

Page 170 of the Draft EIS did spell out the expected levels of performance for the treatment plant in regards to BOD, suspended solids, dissolved oxygen and chlorination. These are the applicable requirements of Pennsylvania Department of Environmental Resources for effluent disposal to this segment of the Schuylkill River. At present there does not exist requirements for nutrient removal as the CVSA requests. Certainly the suggestions of the CVSA will be given consideration when and if water quality requirements are expanded to include nutrient removal. Also, see comment/response for U.S. Department of Commerce and comments submitted by DER in addition to relevant discussion throughout the Final EIS.

Comment:

What is the pollutant load at the mouth of Pickering, French, and other tributaries to be sewered? Are they more or less contaminated than Valley Creek?

Response:

The Draft EIS presented the pollutional loads of the tributaries in relative terms (Table 8). The Final EIS reflects additional information compiled in regards to existing conditions.

Unfortunately, the excellent bacteriological data provided by the CVSA on the Valley Creek was not made available at the Draft EIS stage. While the French, Pickering and Valley Creek are listed as "heavily polluted" at the mouth, it is likely that the Valley Creek, because of its smaller flow and the population density of its watershed is the most heavily polluted in terms of concentration.

Comment:

Will the Schuylkill River suffer increased or decreased enrichment as a result of discharging proposed loading rates from the treatment plant?

Response:

Again, while difficult to assess numerically, the river should see a reduced enrichment in terms of nitrogen compounds. It is possible that the phosphate loading would increase slightly since that compound is probably removed by the soil in current subsurface disposal practice. That compound will not be diverted from the plant and as mentioned before will not be removed unless so required. DER feels that the Schuylkill can handle this with no ill effects. It is important to remember that problems such as these can be addressed. The proposed action is not a final solution.

It is not planned to operate the plant to meet the level of performance indicated in the CVSA letter:

0.8 ppm phosphate (ortho)
.03 ppm No
4.16 ppm No
4.52 ppm Cl

This performance requirement is not required for the River. DER has set the requirements for current need as discussed in the EIS. While the river is not expected to be subject to a high degree of eutrophication, the state does require nitrification, a step to oxidize ammonia nitrogen. If required, the plant as designed, could achieve the phosphate level by the addition of chemicals. A substantial increase in operating cost would result. 310

The reduction of chloride content is not required at all. It would result in great cost increases to achieve this level with little to no justification.

The bacteriological quality of the plant effluent will be better than the levels indicated in the CVSA report for the Valley Creek.

Comment:

What future plans are under consideration for solving water quality problems of tributaries to the Schuylkill River?

Response:

The Montgomery County plant at Oaks has been designated a sub regional facility by the Commonwealth of Pennsylvania. The future of other "regional" plants is dependent and will be determined as a result of the comprehensive water quality management plan that the state is currently developing. This plan will prevent proliferation of plants and will provide for the most cost effective and environmentally sound approach.

Comment:

Why does EPA continually favor the large scale approach for waste-water treatment?

Response:

Regionalization implies a single administrative agency which plans, constructs and manages all waste water facilities in an area. Certain economies accrue from centralizing the functions of personnel, laboratories and maintenance. Other economies may accrue from planning a configuration of facilities. The agency can plan development of the facilities such that cost effective configurations result. Small treatment plants can be avoided and economies of scale can be realized by construction of the proper facilities. Trunk sewers are evaluated and the total cost of all facilities to the users defines the proper configuration. The overriding constraint in water quality planning is the maintenance of water quality goals. With the advent of reliable and effective advanced waste treatment facilities, it is now feasible to consider maintaining good quality waters in small streams by high performance treatment facilities. The cost effective strategy may be several of these facilities dispersed throughout the metro area rather than one large centralized facility with its attendent trunk sewers.

71 Comment:

Portions of the Valley Forge plan call for diverting flows from the Ridley, Crum, and Darby Creeks to the Schuylkill River. The effect of imparting all of this extra effluent on the River is not discussed.

Response:

Page 209 of the Draft EIS covered this point indicating the diversion is anticipated (based on population projections) to be quite small (approximately 3.86 MGD for the year 2020 not 23 MGD as stated by the CVSA). Consequently, the effect on the River will be insignificant due to this extra effluent.

Comment:

EPA should ensure proper construction practices.

Response:

See comment/response for similar question by U.S. Department of Commerce.

Comment:

It is requested that proper evaluation of spray irrigation as an alternative treatment method be done with quantitative evaluations of (a) available sites, (b) cost effectiveness, (c) environmental impact and (d) land use.

Response:

The Final EIS has been revised to include such discussions under the alternative section.

Comment:

Some of the information provided in the Draft EIS in regards to spray irrigation is in conflict with data available from Penn State University.

Response:

Green Valleys Association has provided information including comments from Dr. Sopper of Penn State. Spray irrigation has been evaluated as thoroughly as time permits and the corrections noted in your comments and those of Dr. Sopper have been made part of the Final EIS.

19. U.S. Department of the Interior

Comment:

Compliance with Section 106 of the National Historic Preservation Act of 1966 is not indicated in the Draft EIS.

Response:

Full compliance with Section 106 of the National Historic Preservation Act of 1966 has been obtained and is discussed in detail under Section V "Proposed Project".

Comment:

Is the Valley Forge State Park Commission in agreement with the adequacy of the protective measures to be used in the construction of sewage facilities affecting the Park.

Response:

A proposal initiated by the Valley Forge Sewer Authority and Mr. William Wewer, State Liaison Officer, was submitted to the Valley Forge State Park Commission for their approval. The proposal included provisions for protection of archeological resources, landscape rehabilitation, design features for pump stations and measures to be employed during construction and operation of the sewage facilities which may affect the Park. This proposal was agreed upon and adopted by the Valley Forge State Park Commission on June 25, 1973. Pertinent correspondence and the adopted resolution are found in Appendix 5 Exhibit 2.

Comment:

Objection to the term "private" as used in Plate 19.

Response:

Your reference, it is assumed, is to the term "private open space" not "private recreation". Identical designations are used to denote flood plain and private open space on Plate 19. Close examination reveals that most is attributed to flood plain areas.

Comment:

The listing of macro-invertebrates, birds and mammals and vegetation etc., found in Appendix 3 of the Draft EIS, is not as meaningful a presentation as it could be. Greater definitive descriptions in relative imporance of these species for the area would be much more useful.

Response:

The listing in Appendix 3 of the Draft EIS including Exhibits 1 through 6 have been replaced with a more meaningful presentation at your suggestion. The new information in regards to plants, animals, birds, amphibians, and reptiles, was obtained from the Final EIS on the proposed Limerick Generating Station Units 1 & 2, Philadelphia Electric Company, prepared by the U.S. Atomic Energy Commission in November, 1973. Sources of information used in the tabulations are noted in each categorical section.

The geographical proximity of the proposed Limerick Project to the Valley Forge Sewer Project is such as to reflect ecologically similar conditions. Examination of the tabulated presentations in the Appendix reveals many areas of data and census gatherings common to both projects. It is now felt that the information in the Final EIS (Appendix 3 and text) is quite sufficient in detail and will serve adequately for further ecological investigations or purposes in the Valley Forge area.

Comment:

It is unclear as to the term "preceding paragraphs" under Section II.I - Land Use.

Response:

The word "preceding" is in error and has been changed to "following".

Comment:

A section entitled "Recreational Uses" should be included under the "Land Use" heading.

Response:

Various sections in the EIS indirectly discuss recreational opportunities and facilities in the Study Area. The Final EIS has been revised to include further discussions.

Under "Impacts of the Proposed Project", one entire section is devoted to "Impacts on Recreation" which this Agency feels is a sufficient discussion.

Comment:

It is not clear whether the overall BOD reaching the Schuylkill River will be reduced or increased by construction of the treatment plant.

Response:

At 8 MGD flow (design year of 1985), a residual BOD loading of about 1,300 lbs per day will be discharged to the River. Certainly, the discharge of any amount of pollutants to a body of water is not desirable, especially if those waters are used for recreational and water supply purposes.

The inland streams tributary to the Schuylkill River are primarily the major source of pollutants now reaching the River in the project area. The polluted conditions in these inland waterways are attributable to upstream STP discharges and runoff from areas containing malfunctioning septic tanks. Precisely how much of the septic water now finding its way to the Schuylkill River via these streams (French, Pickering, Valley) is difficult to quantify. However, it can be stated with assurance that the quantities of pollutants discharged from the plant will be less than the current pollutional load contributed by the streams to the River plus the load that goes to groundwater.

Comment:

Wildlife populations, in relocating to adjacent lands, may be reduced in numbers due to the decrease in habitat available.

Response:

During construction operations wildlife habitats will be disturbed forcing relocation. However, for the most part, this relocation will be temporary until construction operations are concluded. The sewage treatment plant site will force a permanent relocation on the habitating wildlife during construction and operation phases.

It is felt that if the areas currently designated as woodland, meadow, pastureland, open space, etc., are preserved, as most should be, the overall impact as a result of this relocation will be small. In addition, the land areas involved represent only a very small fraction of the total habitats available in the project area.

APPENDIX D

Summary of Public Hearing
(January 10, 1974)

The Hearing Officer, Mr. Snyder: Ladies and gentlemen, with all due apologies for the weather, I would like to start off this proceeding.

The Public Hearing on the Draft Environmental Impact Statement for the Proposed Valley Forge Waste Water Treatment Facility is now open.

Mr. Daniel J. Snyder, III. I am the Regional Administrator of the United States Environmental Protection Agency for the Middle Atlantic Region, Region III. With me on the Hearing Panel is Joseph Manko on my left, who is Regional Counsel of EPA; on my right, George Dukes, Director of our Civil Rights and Equal Opportunity Division.

For the record, we are opening this hearing at 7:30 PM Thursday, January 10, 1974, in the Conestoga Senior High School, Conestoga and Irish Roads, Berwyn, Pennsylvania.

We are here tonight to receive testimony on the environmental effects of a proposed 8 million gallons-per-day wastewater treatment facility on the Schuylkill River, and the associated interceptor systems. EPA has received applications for construction grants for these projects from the Valley Forge Sewer Authority and the municipal authorities of Malvern Borough and Tredyffrin, Willistown, East Whiteland, and Easttown Townships.

This hearing is held pursuant to EPA's interim regulations governing environmental impact statements. These regulations allow the Regional Administrator, at his discretion, to conduct a public hearing on the environmental impact of a proposed action if he determines that such a hearing would facilitate the resolution of conflict or significant public controversy.

The purpose of this hearing is to hear from the public - from any of you who wish to express your views. We are here to listen, not to state our views. Therefore, there will be no questioning of the panel. The Agency has recognized that some members of the public might have questions about the Draft Impact Statement; thus, although it was not a requirement we held a public briefing in this room on January 3, 1974. In response to requests received at that briefing and since, I am extending the mandatory 45-day comment period on the Draft Statement until February 12, 1974, to insure that the public will have full opportunity to provide its input and comment. All written comments received prior to that date will be fully considered in preparation of the final Environmental Impact Statement.

A number of persons have indicated a desire to testify tonight. I will call on these individuals by name and, where known, also indicate their organization. Anyone else who wishes to testify may so signify by signing in with Miss Malone at the table near the door.

Because of the large number of persons who wish to be heard, each of you will be asked to keep oral presentations as brief as possible, but hopefully in no case more than 10 or 15 minutes. Please summarize any extensive written materials and submit it to the stenographer for inclusion in the record in full. As I indicated, further materials may be submitted directly to EPA at any time prior to February 2. These should be addressed to Mr. Robert Blanco, Chief, Environmental Impacts Branch, EPA, Region III, Curtis Building, 6th and Walnut Streets, Philadelphia, Pennsylvania 19106. That address again - Mr. Robert J. Blanco, Chief, Environmental Impact Branch, Environmental Protection Agency, 6th & Walnut Streets, Curtis Building, Philadelphia, Pennsylvania 19106.

As the first witness I would like to call on Mr. Blanco to give a brief summary of the Draft Statement. Mr. Blanco.

MR. ROBERT BLANCO: Thank you, Dan.

Ladies and gentlemen, good evening. My name is Bob Blanco, I am Chief of the Environmental Impact Branch of EPA, Region III. Recognizing that any summary is necessarily incomplete, I would like to describe briefly the Draft Environmental Statement for the proposed Valley Forge Wastewater Treatment Facility.

The Valley Forge Sewer Authority, together with five municipal authorities, has applied for EPA grants to assist in construction of an 8 million gallons-per-day sewage treatment facility and trunk sewer lines to serve parts of Tredyffrin, East Whiteland, Willistown, Easttown, East Pikeland, Schuylkill and Charlestown Townships and Malvern Borough, all in Chester County, Pennsylvania. The plant, located on a 29-acre site in Schuylkill Township, would remove up to 95 percent of biochemical oxygen demand by an activated sludge process. The effluent would discharge to the Schuylkill River and the sludge would be incinerated, with the ash deposited as landfill. The plant has been sited and designed to provide for expansion in the future if required. This facility is proposed to alleviate health hazards posed by malfunctioning on-lot septic systems in the area and to improve water quality in streams currently receiving overflows from the malfunctioning systems.

In general, the project would remove a health hazard, eliminate sources of raw water sewage now entering local streams and lead to improved soil and water quality. On the other hand, it would create short-term construction nuisances, would involve a commitment of land for the treatment plant and pumping stations and would divert some water between minor watersheds. Unless strict land use controls are applied within the service area, the project could stimulate land development that might have adverse effects on air and water quality.

By category, the project would have the following impacts:

1. Water Quality. There would be favorable impacts on French, Pickering, Little Valley and Valley Creeks, and to a lesser degree on Darby, Crum and Ridley Creeks. The large new direct discharge to the Schuylkill River would be 95 percent treated in critical summer months to maintain water quality standards. Short-term siltation and turbidity are anticipated during construction. Short-term raw discharges would occur in the unlikely event that main and backup pumps both fail at any pumping station. Groundwater quality would be improved by the elimination of septic systems.

2. Water Supply. This project would remove a maximum average of 4.7 inches per year from groundwater tables, a small fraction of normal rain replenishment. It would not add appreciably to the lowering of water tables in Malvern Borough, which appears to be a chronic problem. Uncontrolled development, if it occurs, could result in sharply increased water demand and flood hazards. Project facilities would be safe in floods of Hurricane Agnes levels.

3. Air Quality. There would be short-term dust and vehicular pollution during construction. There would be emissions from the sludge incinerator, which would be controlled to State and Federal limits by a high-energy scrubber. Uncontrolled development, if it occurs, could lead to long-term deterioration of air quality.

4. Natural Resources. The project involves commitment of the construction materials and of chlorine, polymer and fuel oil for operations. The facilities would use 6500 kw of electric power.

5. Land Use. The project would permit substantially denser land uses. Unless carefully planned and controlled, this could result in severe environmental impacts. This project could accelerate the proposed Chesterbrook Development in Tredyffrin Township, but we believe that Chesterbrook could proceed without regard to whether this project is built.

6. *Historic.* There would be short-term impacts on Kimberton Village and Valley Forge State Park during construction. A potential long-term effect on the park has been eliminated by the removal of a proposed pumping station to a remote location.

In accordance with the National Environmental Policy Act requirements, EPA has evaluated a number of alternatives to the proposed action. These include the following:

1. The no-action alternative. This would result in perpetuation of a hazard to public health.

2. Technological alternatives to treatment by activated sludge, including trickling filters, stabilization ponds, and a pure-oxygen process.

3. Disposal of the treated effluent by spray-irrigation instead of discharging into the river.

4. Disposal of sludge by ocean-dumping or land-fill instead of incineration.

And finally the last and fifth alternative: alternative configurations of the total collection and treatment system, including some form of combination with the proposed Oaks Regional Wastewater Treatment System on the opposite side of the Schuylkill River.

Another alternative considered was a system in which two treatment plants would be built, one at the designated site and another on Valley Creek.

This Draft Statement has been filed with the U.S. Council on Environmental Quality, as required by the National Environmental Policy Act, and circulated among interested Federal, State and local agencies and other interested parties. A list of the initial circulation is included in the Draft Statement.

TESTIMONY PRESENTED BY:

PAGE

Harriet Stone, Green Valley Association....................

Christian T. Beechwood, Regional Sanitary Engineer, Pa. Department of Environmental Resources, Norristown Office............................

Joseph Gellings, Willistown Township Ad Hoc Committee...

William H. Lamb, Esq., representing the Valley Forge Sewer Authority, Tredyffrin Township, et al.........

Maxwell Powell, President of the Chester Valley Knoll Civic Association, East Whiteland Township...................................

Thomas A. Randolph, Chairman, Malvern Borough Planning Commission...................................

John B. Yerkes, Jr., Consulting Engineer to the Easttown Municipal Authority........................

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Edward W. Furia, Esq., representing the Green Valley Association, the Chesterbrook Conservancy, et al..................................

Richard L. Bazelon, Esq., representing the Fox Companies......................................

Ralph Heister, Green Valley Association...................

Barbara M. Garner, Philadelphia Conservationists, Inc.......

G. M. Aman, Esq., of bond counsel for the Malvern, Easttown and Tredyffrin Authorities......................

Emanuel V. Lauria, representing the Board of Governors of Citizens Organized to Reclaim Chesterbrook (CORC)......................................

Mrs. John J. Gallagher, Willistown Ad Hoc Committee..

Mrs. Alexander Mushaha, Paoli.............................

Dr. Joseph Weinstock, Chairman of the Valley Forge Sewer Authority..................................

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Richard Fox, The Fox Companies............................

Rolf A. Brachwitz, member of the Malvern Borough Planning Commission, speaking as a private citizen.......

James D. Thompson, Dunn Geoscience Corporation.............

Thomas Hagan, Chester Valley Knolls Civic Association...

Samuel P. McCleary, Willistown Township Ad Hoc Sewer Committee.................................

Harold Roeder, Willistown Township........................

Norman P. Nields, Willistown Ad Hoc Sewer Committee..

Ann Platt, Chesterbrook Conservancy.......................

Peter Rodgers, Chairman of the Board of Supervisors, East Pikeland Township....................

Richard Byler, Chester County Planning Commission.. 407

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STATEMENTS SUBMITTED FOR INCLUSION IN THE RECORD:

Porter N. Carlson, East Whiteland Township..................

David G. Rowland, Charlestown Township; member of the Valley Forge Sewer Authority................

Edwin L. Lewis, Jr., Robert M. Burford, Harold F. E. Jeunet, Board of Supervisors, East Whitefield Township..................................

V. Harry Adrounie and A. C. LaBoccetta, M.D., Chester County Health Department..........................

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Ms. Harriet Stone - representing the Green Valley Association

Support for the improvement of water quality

Two main objections:

(1) Oversized plant will cause uncontrolled development and ill-planned growth;

(2) Alternatives should be assessed more thoroughly.

Major concern is based on the effect the proposed plan will have on growth and the effect of the growth on the service areas.

States that growth is not under local control and that growth will occur because the cost to developers is reduced.

Requests that the Final EIS include an evaluation of the impacts resulting from increased population as stimulated by the sewer system. "This analysis that we are asking for should also include the rationale for wanting development at this location rather than at a site where services are already provided.

Asks EPA to require control on the rate of growth to ensure that the population to be serviced, does not exceed the design year (1985) projection.

Comments on the chosen region for treatment:

(1) Regionalization is good economically, however, it will encourage unbroken development in that region.

(2) The quality of the stream is best expressed by treating the whole stream. Any region which divides a watershed in half is not well chosen environmentally.

Requests that Final EIS explain why the region was designed in this manner.

Requests that several small treatment plants be used as an alternative to one large plant. Asks that this alternative be considered in Final EIS.

Requests that Final EIS include the environmental and financial impact of the worst possible accident at times of low flow and an analysis of the frequency of recurrences of such an accident. The effect that this accident would have on pretreatment costs for downstream usage should be computed.

Christian T. Beechwood - Regional Sanitary Engineer
Pennsylvania Department of Environmental Resources

The Department endorses the project.
The Departmental Regulations regulate the approval for extensions of public sewer systems.
Local municipalities are in charge of Land Use plans, control, and development.

Mr. Joseph G. Gellings - Ad Hoc Sewer Committee

(Speaking specifically about the Willistown Area)

States that Willistown should not be a part of the Valley Forge Wastewater Treatment Facility.

Reasons:

(1) High costs for the homeowners.
Survey conducted; 815 people answering results:

35 - could afford the costs.
48 - would have to move or sell home.
68 - costs would be an extreme hardship.

(2) Poor cost effectiveness.

(3) Willistown is located on the wrong side of a mountain from the WWTF. Willistown is located in a different watershed from that of the proposed WWTF.

This is the factor which results in the high costs.

Proposal:

Spray-irrigation with treatment locations south of the area to be sewered.

This system would make use of gravity flow rather than pumping stations and therefore lessen the costs.

Mr. William H. Lamb - Representing Valley Forge Municipal Authority, Tredyffrin Township, Easttown Township Municipal Authority, Charlestown Township, East Pikeland Township

The Firm Lamb, Windle & McErlane represents the groups mentioned above. All of these groups still support the project.

(In response to Ms. Stone's statements)

States that "the fact that you don't have sewage facilities is no excuse to zone an area for low density."

States that the growth in Chester County is not uncontrolled. The county planning agency must review and comment on any zoning ordinance. There is zone planning in Chester County and many controls are imposed prior to any development.

Mr. Maxwell Powell - President of the Chester Valley Knoll Civil Association

Does not believe that the proposed Valley Forge Regional System is a true regionalization project.

He can see that in the future where a sewage treatment company and its interests, may possess and own land in other areas that would be conducive to sewering by the expansion of the treatment plant. This does not fit into true regionalization of East Whiteland Township.

Mr. Thomas A. Randolph - Chairman of the Malvern Borough Planning Commission and resident of Malvern

Concerned about the effects of the proposed project on Malvern's municipally owned water supply. Specifically, the possible severe effects of sewering on Malvern's water table and its jeopardy to Malvern's springs and wells.

Speaking as a citizen....

Of specific concern to the residents and the Malvern Borough Commission, is the possible decrease of water supply due to the lowering of the water table.

States that the slopes of the Malvern area, are suitable for development.

Malvern is firmly committed to the modernization of their own system in an attempt to supply their own water.

It is Mr. Randolph's belief that the section of Crum Creek, in Malvern, has not had any significant pollution in the past.

From information received from Dr. Claude Nolte, the Malvern area could have as much as 50% recycling. However, this recycling is lost if the Malvern Area sets up sewers.

Raises the question of auxiliary run offs due to the type of bedding in which the sewer pipes are to be laid. Asks that more intensive study be done.

Mr. John B. Yerks, Jr.
Consultant Engineer to the Easttown Municipal Authority

Over the last 2 years, Easttown has had three possible alternatives for sewage treatment. They are:

(1) Connection into the Radnor System.
(2) A local plant in 2 separate areas.
(3) Connection into the Valley Forge plant.

Initiated an investigation into the feasibility of spray-irrigation in Easttown. (In process of designing 2 in rural Chester County).

He believes that spray-irrigation and lagoon systems cannot be applied in this case.

Easttown Township has had a standard sewage treatment collection system designed.

Two alternatives Are:

(1) Vacuum system
(2) Pressure system

Neither of these alternatives appear to be advantageous for this project.

The over-all picture consists of two alternatives.

(1) Discharge to the ground (which is the problem).
(2) Discharge into a stream with treatment.

The only system available consists of a small individual sewage treatment plant, small sand filter, chlorination with a discharge pipe to the stream. All maintenance must be performed by the home owner, therefore, on-site sewage systems are not alternatives.

Mr. Edward W. Furia - Lawyer and City Planner
Specializing in national and local land use and environmental questions.

Represents himself, as a citizen of Chester County and the Green Valley Association, the Chesterbrook Conservancy, the Committee organized to Reclaim Chesterbrook, and the Willistown Ad Hoc Sewer Committee.

Questions the application of the regionalization concept and the sense of building a sewage treatment plant twice as large as is needed.

Believes that building a wastewater treatment facility in Chester County, would cause the population in that area to double. The result, over development in this area.

Believes that if EPA studies the population growth potential, due to regionalization, they will see that the Valley Forge wastewater treatment facility will only need to be half as large as proposed.

Under the Clean Air Act, Section 208 of the Water Bill, and the National Environmental Policy Act, EPA is required to prevent air & water pollution before it occurs. EPA is required to employ land use and transportational controls to reduce air pollution. This requires EPA to try to reduce development in areas such as Valley Forge.

Believes that EPA cannot continue to claim that land use and growth questions are purely local matters.

Urges EPA to study alternative growth patterns to determine whether these growth patterns, which are supported by the wastewater treatment facility, will be the most acceptable from an environmental, energy, and socio-economic standpoint.

Wishes EPA to request an amended application for funding from the Valley Forge Sewer Authority which would reduce the capacity of the wastewater treatment facility required by these Chester County communities.

Mr. Richard L. Bazelon, Attorney for the Fox Companies

States that the Chesterbrook proposal, (as it is known today), was first submitted to Tredyffrin Township in 1971. The planning performed by the regional authorities, the county authorities and the Township goes back to the 1960's. The Delaware Valley Regional Planning Commission pointed out in their own study, the desirability of having controlled development, which would be concentrated in the eastern portion of the county. (This is due to the accessibility of transportation facilities in the eastern portion.)

In essence, the Chester County Planning Commission presented the same themes in their own report, with regard to controlled growth in the areas that are appropriate for development.

With this background from the regional and county authorities, Tredyffrin Township began its planning in the late 60's and early 70's, and decided that growth should be pin pointed. The Township should take the initiative rather than the developer and indicate the appropriate areas within the Township that could best accommodate growth.

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Makes note to the fact that an independent planning consultant, hired by the Board of Supervisors of Tredyffrin Township, concluded after studying the Chesterbrook Plan: "The comparison of the ecological analysis and the pattern of land uses proposed for Chesterbrook reveals a strong inter-relationship. Land most suited to high density development is where such density is located."

Points out that no development can take place within the Chesterbrook tract without further governmental approval. That is, the approval of Tredyffrin Township and other governing bodies.

Before Chesterbrook can be developed, the Board of Supervisors, the Planning Commission and/or the Zoning Hearing Board must review the project to assure that the developer's commitments are maintained and followed, and; that all criteria in the Zoning Ordinance and Subdivision Ordinance are complied with.

Believes that the ideas presented, are the basis of controlled development and the antithesis of the kind of urban sprawl that should be avoided in Suburban areas.

Mr. Richard L. Bazelon, Attorney for the Fox Companies

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Believes that the ideas presented, are the basis of controlled development and the antithesis of the kind of urban sprawl that should be avoided in Suburban areas.

Believes that the environmental aspects of Chesterbrook have been thoroughly explored.

States that the acquisition of Chesterbrook is not essential for the development and preservation of Valley Forge Park.

Points out that 320 acres of Chesterbrook's approximate 850 acres are going to be deed-restricted open space. This includes all streams and vegetation on the entire site. The Chesterbrook site is almost entirely used for farming and pasture. This is not a case of tearing down woodlands.

There is to be no building on the flood plains or steep slopes.

With regard to storm water run-off, Chesterbrook is to use a system of retention basins which will control stormwater runoff. The plans for sedimentation, erosion and flood run-off control must be approved by the Soil Conservation Service and the Pennsylvania Department of Environmental Resources.

The Soil Conservation Service and the Pennsylvania Department of Environmental Resources have approved the soil siltation and run-off plans of Chesterbrook.

This system of retention basins will collect the silt and this silt will settle out in these retention basins and will not go into the streams, as it presently does. This same procedure holds true for the nutrients.

States that there will be no problem with bacteria if the site is properly sewered and that no development will take place unless the site is properly sewered.

With respect to wildlife, there would be a reduction to some open field species, however, other kinds of species would increase. (e.g. the bird population). States that the developer has agreed to preserve all the stream borders, to taper the edge of the naturally wooded areas, and to keep within the open space system all the connections with Valley Forge Park. These precautions and protections will assure the maximum preservation of wildlife on the site.

Mr. Ralph Heister - Green Valley Association

Points out that studies indicate the need of sewers. Within the drainage basins in the headwaters of the Valley Creek Watershed, there is a trailer court and a high school, but there is no sewage treatment plant. There are two sewage treatment plants located in Immaculata College and a minimum of 120,000 GPD will be discharged into the stream which will not be sewered.

States that at least 2 of the sewage treatment plants in the Valley Creek Watershed have been cited by the Department of Environmental Resources as not operating properly. Asks why these plants are left out since the function of the sewer plan is to improve the environment.

Does not believe that the EPA has looked very carefully at Willistown Township with regard to the cost benefit, and asks for a closer examination into this.

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Points out that EPA believes that spray irrigation is harmful to wildlife and that a report performed by the College of Agriculture of Pennsylvania State University believes that spray irrigation encourages wildlife.

States that the Green Valley Association believes that the Valley Creek Watershed has a 100-year rainfall discharge of 6,360 cubic feet/sec under present conditions. (Determined by the soil cover complex method).

Believes that the estimates for 100-year rainfall will increase as urbanization increases in the Schuylkill River Basin. There is some question in the estimating of elevation, rainfall, and its effect on this sewage treatment plant, on urbanization in this area and other treatment plants upstream, and future urbanization upstream in the Schuylkill River Basin.

The townships of Valley Creek (excluding Easttown and Schuylkill Townships) are not presently geared for growth and do not have the mechanisms to control growth. They are not yet prepared.

States that the carring capacity concept has to go beyond the Valley Creek Watershed and include the Schuylkill, since the effluent from an 8 MGD treatment plant would represent 2% of the Schuylkill River during low flow. At 60 MGD this would be slightly more than 15% of the river during low flow from one treatment plant located on that river.

States that EPA should more closely evaluate the dams and reservoirs since where there is urbanization, many dams and reservoirs no longer function and the water quality is degraded.

Ms. Barbra M. Garner - Philadelphia Conservationists, Inc.

(This company owns the Sharp's Woods Nature Reserve in Easttown Township).

States that the reserve has been preserved as a natural open space. The Dalyesford area of the proposed Wastewater Treatment facility includes the reserve, and as proposed by Yerkes Associates, Inc., (for Easttown Township), a main force and gravity line are planned to parallel the Darby Creek. This will take in the entire length of the Reserve for a distance of 2000 feet. In addition, 3 gravity flow lines traverse the property at 3 locations for a total distance of approximately 535 feet and then join the gravity flow line along the Darby Creek. The placement of the Valley Forge Wastewater Treatment facility through the reserve, will result in considerable damage to this natural area. 413

The Philadelphia Conservationists, Inc., is not opposed to the construction of a sewer system in the Daylesford Area in the area of Sharp's Woods. However, the Philadelphia Conservationists, Inc., requests that the location of one of the three gravity flow lines be reconsidered.

Requests that the gravity flow line along Argyle Road join the line on Leopard Road thus eliminating any connection with the east-west gravity flow line through the Sharp's Woods Nature Reserve.

Mr. G. M. Aman, III, Esq., Bond Counsel for the Malvern, Easttown and Tredyffrin Authorities.

States that the estimated cost of the project for Easttown has increased approximately 1 million dollars during the period of delay for the Environmental Impact Statement. In the last two years, the cost of this project for Easttown has increased from 4 million to 5 million dollars. Therefore, it is time to stop studying the project and begin solving the problem.

Another effect of further delay in implementing this project, is the continuation of further low-density development.

States that the alternative of sewering the Willistown-Easttown area from the south by gravity feed through the Delaware County Regional Project, would not take place until after 1990.

Believes that placing the sourthern portion of this project region into the Delaware Regional Project is not a viable alternative.

States that holding down development in one area of suburban Philadelphia by preventing sewering in that area, only increases the pressure for development in other areas.

Mr. Emanuel V. Lauria - Representing the Board of Governors of Citizens Organized to Reclaim Chesterbrook.

Believes that the basis for EPA's EIS was wrong and that a new study must be done before any final statement can be made.

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Mrs. John J. Gallagher - Willistown Ad Hoc Committee

Objects to the spending of money in Willistown Township when only a small proportion of the people are going to be burdened with the cost of the sewers and that most of these people do not need sewers.

Wants to be assured that the individual homeowners will benefit from a sewer system.

Wants to know why the individuals should have to spend money to "hook-up" to a sewer system when their cesspools are presently functioning properly.

Mrs. Alexander Mushaha - Citizen of Paoli

Believes it to be unfair to be forced into spending money to have a sewer system, when her cesspool system is functioning properly.

Dr. Joseph Weinstock - Chairman of the Valley Forge Sewer Authority and the Valley Forge Joint Board.

Agrees with EPA's conclusion that degradation of water quality in the area and existing and future public health hazards justify the proposed action, therefore the proposed WWTF is required.

Does not agree with the idea that the Wastewater Treatment Facility will definitely result in uncontrolled development. Believes that the enforcement of land use regulations by the participating communities has been and will be effective.

States that the project is financially, technically, environmentally and administratively sound.

Points out that construction cost increases on this project were estimated at an average of $350,000 per month and there is no reason to believe that this inflation has stopped. 415

Believes that the cost of the total project has increased by 5 to 6 million dollars, within the last eighteen months.

Points out that the $15,122,000 grant is fixed and that the local communities must pay the balance.

Proposes 2 positive actions which he hopes EPA will recommend and discuss in the draft. They are:

1) funding a supplementary sewer application.
2) funding on actual construction costs on the part of the state.

Mr. Richard Fox - The Fox Companies

States that Chesterbrook was designed on the basis that those areas which are environmentally fragile would not and should not be developed. The less fragile areas with well-drained soils, reasonable slopes and no woods, are the areas which should and will be developed.

With regard to air pollution from mobile sources, the Chesterbrook community will be connected to the commuter railroad stations with regular bus systems and this will again minimize the individual use of automobiles in the surrounding area.

Within the State of Pennsylvania, lots in excess of one acre may be subdivided with virtually no control on their environmental impact.

States that in the Valley Forge area, approximately 600 acres of land are currently proposed with a minimum exceeding one acre. By law, without analysis of the environmental impact, this land can be developed without sewers. A curtailed Valley Forge Wastewater Treatment Facility will perpetuate this proplem. Development will not stop in this area.

States that intensive land usage inherently has a negative impact upon the environment and this is true if it is assumed that the intensive land use is not an alternative to low-density land uses which spread urban sprawl across large areas.

Well planned communities with reasonable densities of population and proper location, are necessary to prevent the continuation of surburban sprawl.

Since the sewer system for Chesterbrook will start construction before the Valley Forge Wastewater Treatment Facility will be ready to accept the sewage, an interim facility will be built in accordance to the requirements of the Pennsylvania Department of Environmental Resources. 416

States that the present pattern of development should not be continued and that communities like Chesterbrook should be developed to handle the basic housing needs within the Valley Forge area.

Mr. Rolf A. Brachwitz - Member of the Malvern Borough Planning Commission.

Speaking as a private citizen:
States that the system, as proposed, will be obsolete within 5 years.

States that there is a need for sewage treatment. That is, treatment of sewage and not sewers.

Believes that since present methods of sewage treatment will become obsolete, new methods must be sought.

Mr. James D. Thompson - Senior Engineering Geologist from the Dunn Geoscience Corporation. He represents the Fox Companies.

His company was hired by the Fox Companies to assure that the environment and the site are compatible with plans for the development.

States that specific attention was paid to the problems concerning the sinkhold development and the limestone or corse terrain. Particular concern was shown for the hazards these problems might pose to the planned development or planned structures, and pollution of the aquifer.

States that the basic problem with the Chesterbrook site is that it lies within an area of limestone terrain known to be susceptible to sinkhole or corse development. With respect to this fact, Mr. Thompson's function was to determine if the planned construction was compatible with the existing site conditions.

To this end, Mr. Thompson employed the following techniques:

1) Seismic defraction.
2) Electrical resistivity.
3) Test fits.
4) Bore holds.
5) Air trap drill holes.

411 These methods were tested on the 250 acre portion of the site which will undergo the first phase of development.

This investigation concluded that on this 250 acre portion, any problems which came about could be solved by designing footings or foundations or other physical engineering characteristics; or to simply not build on environmentally and/or geologically sensitive areas.

States that the specific site plans, which have been prepared by the architectural firm, Cope, Linder, and Walmsley, were made in accordance to his company's findings.

He has concluded that upon completion of the Chesterbrook Development, the aquifer will be improved rather than degraded. The reasons leading to this conclusion are as follows:

1) Since sinkholes are commonly used as garbage disposal pits, the material conveniently sinks out of sight into the ground. The developer will seal these sinkholes and therefore prevent them from being used as garbage dumps.

2) Since common farming practice is to plow the furrows downhill, (rather than contour plowing), rainfall causes large amounts of sediment to run-off into the streams and tributaries to Valley Forge

Creek. Development will stop this activity. Grasses and vegetation will be planted so that the general degradation of the surface water run-off will be stopped.

States that because of these environmental considerations, the general quality of the Chesterbrook area will be increased and not degraded.

Mr. Thomas Hagan - Chester Valley Knolls Civic Association

Believes that development is uncontrolled and may get out of hand.

Questions the cost feasibility. States that the individual homeowners are being forced to pay high prices for "hook-ups" into the system.

Mr. Samuel P. McCleary - Willistown Township Ad Hoc Sewer Commission

Wonders what will happen to those people who can't afford to pay the money to join the system.

Mr. Harold Roeder - Willistown Township

Believes that the individual homeowners should speak out, since the proposed project directly affects them.

Believes that information is being withheld from the general public.

States the reasons for the sewer systems

1) to alleviate public health hazards.
2) to improve water quality.
3) to permit orderly growth patterns.

With regard to these reasons, Mr. Roeder states:

a) The hazards to the public health have not been dealt with in detail.
b) Questions whether the dumping of 8 MGD of effluent into the Schuylkill, (which has never previously been done), will improve the water quality of that river.

c) There is no authority to permit orderly growth in Chester County #3. Wants to know how there can be a regional wastewater treatment facility without regional land use planning.

Wants to know why most of the studies and reports on this project are made by men employed by the developer.

Believes that the impact statement was poorly done and reflects the views of the developers only.

States that all the studies performed on this matter, binds the individual homeowners to the stipulations and the cost of the WWTF, and this aspect is not included in the study.

Mr. Norman B. Nields - Resident of Willistown Township and a member of the Willistown Ad Hoc Sewer Committee

States that the current favorable interest is recycling sewage in the Paoli area. That is, recycling at the home as opposed to commercial and industrial on-site septic tanks or cesspools. 419

The next best thing is the spray-irrigation concept, however, there are some sites where another approach to recycling may be more feasible.

Asks EPA to grant an extension for the development of this idea in greater depth if, the Green Valley Association requests it.

Also recommends that if this is persued, it should be considered in the light of seperate treatment facilities for the Valley Forge municipalities, rather than the alternative of a single treatment plant encompassing the entire area.

Summarizing an article in the January 10, 1974, edition of the Suburban Advertiser, Mr. Nields points out the following deficiencies in the draft EIS:

1) EPA lists different project costs and potential grants in 2 sections of its report but does not come up with the correct total construction cost of the entire sewer network.

2) EPA has put Willistown's apartment zone in the wrong place geographically. This results in the apartment zone being placed on the wrong watershed on another table.

3) The township forsees "practically no increase in population for the Ridley-Crum-Darby Basin" and the EPA study shows no increase in the Valley Creek Basin.

4) The study also puts some of Willistown's Industrial Boulevard industries into the Tredyffrin Township column.

5) EPA included a large area of the rural southern part of Willistown in a map designed as areas subject to current sewer studies and within an area which logically might be sewered in the future. Some of this area was not given design considerations.

In response to EPA's questions relating to the availability of land for spray-irrigation in Valley Forge Park: 42

Chairman of the Valley Forge Park Commission (Mrs. Malloy) states that spray-irrigation would be unacceptable under current conditions of Park budget and size.

The Willistown Ad Hoc Committee will confirm by query and request the appropriate extension for inclusion of the written response from the Valley Forge Park Commission after its February meeting.

This misdirection is due to EPA's not planning and pursuing this question with the Valley Forge Park Commission prior to its inclusion in the evaluation of Alternative Three.

It is recommended that EPA request other alternative sites upon receiving the anticipated negative reply from the Commission, with an explanation for that reply.

The Willistown Ad Hoc Sewer Commission has expressed its dissatisfaction with the scope and timing of the proposed collection system with regard to Willistown.

Requests an appropriate extension from EPA, so the results from the January meeting of the Willistown Municipal Authority may be included in the EIS.

Mrs. R. S. (Ann) Platt - Chesterbrook Conservancy

Concerned with 2 proposals:

1) The Chesterbrook Plan
2) The Valley Forge Regional Sewer System

Does not believe the statement that, "the sewers were not planned with Chesterbrook in mind".

States that the Fox Companies initiated the original purchase of Chesterbrook in 1964.

The residents of Tredyffrin received the Comprehensive Land Use Plan in April of 1970. This plan designated an area of land as Unified Development District, to enhance the Township in planning and open space. After this proposal, the Planning Board in Tredyffrin twice turned down a position to be planned in the same manner as Chesterbrook.

421 The Valley Forge Sewer Agreement was signed in November of 1970.

States that Chesterbrook cannot be built without sewers.

States that if this development, through state and local permits, is allowed to build its own treatment plant, then the theory that only regional systems are to be considered, is in question.

Agrees that sewers are needed, and a huge development would compound the problem.

States that a fully developed Chesterbrook is twice the 9,335 population stated in the draft EIS.

States that offices, shops, and motels must be included in this figure.

States that there is one important condition for Chesterbrook's application for a spray-irrigation permit. That the spray-irrigation be terminated and the development tie in with the new sewers when the lines are operable.

It appears that Chesterbrook would be the first consideration, not present needy residents. Tredyffrin would then lease unused capacities from other townships. Chesterbrook will obviously tie into the new sewer system. All of Chesterbrook will have to be sewered.

The Conservancy is asking EPA to study the impact of Chesterbrook in relation to sewers, as well as to projected growth and to consider the effects on the aquifer. Chesterbrook will be of primary impact.

Mr. Peter Rodgers - Professional Engineer and Chairman of the Board of Supervisors of East Pikeland Township

States that most people in East Pikeland agree that the need for wastewater treatment is greater than the cost.

Believes (from previous testimony) that many people want to stop Chesterbrook, by stopping the construction of this sewer system.

States that further study will only result in a further delay of the implementation of the system, and that the studying must stop.

States that stopping the sewer system will not stop Chesterbrook. 422

States that from an environmental standpoint, there is no regional system. All high-density development will take place along existing creeks and streams where developers can build their own plants.

A regional plant will allow for concentration of development on land that is best suited for such development and the maintenance of open space and flood plain lands where it is most desirable.

The East Pikeland Board of Supervisors voted unanimously to go on record as wanting to start the sewer system construction as quickly as possible.

States that East Pikeland has a comprehensive zoning ordinance, a subdivision ordinance, which has recently been revised, and this includes a flood plain section. All of East Pikeland's ordinances are well enforced.

Mr. Richard Byler - Member of the Chester County Planning Commission.

States that the environmental benefits outweigh the costs.

The information included in the EIS was available and used during the planning process.

Does not believe that the overall benefit to the economy and ecology of the encouragement of well planned development in the Valley Forge Area, was fully treated in the draft EIS.

Believes there is a need to cut the cost of commuting and have a closer link between home and employment, in an attempt to reduce air pollution and energy consumption.

States that the Valley Forge Area is the right part of Chester County to have urban development.

Believes that the population growth rate is being overestimated by many of the planners. States that over a 10-year period, only about 30000 units at 4 per acre, will be built. This figure represents approximately 475,000 people. States that, in order to overdevelop the county in a way that many people believe is inevitable, it would require millions of people in the same 10-year period.

States that the population growth rate is not out of control because:

a) Immigration from other parts of the country is decreasing.

b) Slower birth rates since 1964.

In the development of the Chester County Plan, it is the Commission's belief that Valley Forge is the best place for a large portion of the development plans. However, great care should be given toward the determination of how much development should take place in the Valley Forge area, as compared to the County as a whole.

States that the county agencies are trying to help with information and review.

Points out that 3 county agencies review all subdivision ordinances. Two are:

1) The County Planning Commission.
2) The County Health Department in co-ordination with the U.S. Soil Conservation Service.

States that the county is gradually raising standards.

Most municipalities, have this general form of co-operation with the Soil Conservation Service.

States that the municipalities in the Valley Forge Sewerage Area, have adequate planning.

States that, contrary to some statements made by others, Chesterbrook has received more attention, more planning and more study than any project he knows of.

States that the County Planning Commission has developed a sewer plan, a highway plan, and a mass transit plan.

States that the Commisssion will attempt to give more direct attention to land use and housing.

States that the courts are very much dedicated to the need for providing housing. Believes that planned priority is the best way to do this. Hopes that the Commission and the municipalities can work together to get projections of growth a little more translated into land use, in an attempt not to create a false situation of runaway growth.

The County will increase grants to protect those municipalities that work in co-operation with one another.

States that nearly all of the alternatives mentioned in the draft EIS have been considered and that nothing new has been brought out.

Personally, Mr. Byler believes that an interim plan of incorporating spray-irrigation, at Willistown, may have some merit.

Urges the project to begin as soon as possible because further delays will only increase the costs.

Mr. David G. Rowland - Member of the Valley Forge Sewer Authority Joint Board.

States that there is a definite need for sewers in the subjected area.

States that the population in a sewered community uses up far less open space than the same population in an unsewered community.

States that because of malfunctioning "on-site" disposal systems, many of the local streams are becoming dangerously polluted.

Commenting on the criticisms;

1) The County planning commission's policies are ineffective and need to establish land use requirements.

2) The EIS is defective.

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Mr. Rowland cites Pennsyvlania Act 247, which mandates that Townships and Boroughs plan for themselves. Only if they refuse to do so may the County perform this function.

The County does however, review individual projects and has endorsed this one. States that the local governments do have viable programs to control growth. States that the purpose of an EIS is to illustrate every side of the project in question.

States that the main thing to remember, is that all levels of Government have reviewed and endorsed the Valley Forge project.

Believes that since the project has the governmental approvals and financing and the EIS has been written, there should be no further delay in the construction since the costs are continually increasing.

Mr. L. O. Peterson, Jr. - Vice-Chairman of the East Whiteland Republican Committee.

'Representing the 6 precincts of the Republican Party in East Whiteland Township, the committee has unanimously agreed to support the published judgement of the Supervisors of East Whiteland Township with respect to the Valley Forge Wastewater Treatment Project."'

Mr. Edwin L. Lewis Jr. - Chairman
Mr. Robert M. Burford - Vice-Chairman
Mr. Harold F. E. Jeunet

Board of Supervisors, East Whiteland Township

Commenting on the Draft EIS:

1) Appropriate wording should be applied where necessary, to demonstrate the fact that the Regional guidelines, as interpreted by the regulatory agencies has become more expensive than the plant initially proposed for Little Valley Creek.

2) Table 1 (page 12) is incomplete when compared to Table 9 (page 40)

3) On page 42 it should be noted that the largest aquifer in Chester County passes below the Knickerbocker Landfill and that the landfill operation should be discontinued soon, in an attempt to protect this drinking water source.

4) On page 65 the word "resignation" should not be used.

States that East Whiteland has several active and inactive quarries in its northeast quadrant. Large trucks are constantly using the highways in this area and therefore, this area's planning must recognize these facts and plan around them. This results in zoning the large industrial area, and should be arranged with buffers in an attempt to keep the aesthetic qualities of the residential and open space areas.

States that, in East Whiteland the planning and protection of the zoning and land use ordinances have high priority, due to the extreme pressures that are brought upon the township by the developers.

States that with the completion of sewers, East Whiteland's long experience with developers will cause the township to act with greater resolve than normal in maintaining the full intent of their Comprehensive Plan.

act with greater resolve than normal in maintaining the full intent of their Comprehensive Plan.

5) East Whiteland disagrees with EPA statements on page 273 of the Draft EIS, regarding the Townships lack of enforcement of zoning ordinances.

States that at the December 12, 1973 Supervisors' meeting, the equitability of sewer costs between individual households and industrial suers was questioned. It is the Board's opinion that no segment or parties in the East Whiteland sewer area are to receive any preferential treatment. Industry and commercial users will be charged based upon a benefit basis, so that all users will have a fair sewer charge based upon usage.

States that East Whiteland recognizes the need to obtain sewers.

East Whiteland feels that no further delays should be permitted because the costs are continuing to increase. States that futher delays will serve no useful purpose.

Notes that East Whiteland Township is preparing to adopt a new comprehensive plan and zoning ordinance. This will contain provisions for flood plain protection, open space and other important zoning regulations that are fully coordinated with their sewer program.

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Mr. Harry Adrounie - Director, Division of Environmental Protection
Mr. A. C. LaBoccetta, M.D. - County Health Director
Chester County Health Department

States that it is necessary to have a waste water treatment facility.

Feasible systems include:

1) Waste stabilization ponds.
2) Aerobic sewage treatment.
3) High rate trickling filter plants including Imhoff tanks.
4) Large and small tertiary treatment plants.

Each system should be carefully evaluated. Effluents from these systems may be discharged into streams or used for irrigation purposes.

In the opinion of the Chester County Health Department, the waste water collection system and treatment plant recommended, is the most practical and feasible at this time, and construction should begin as soon as possible.

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FOR STUDY OF 21 LARGE MAPS, NOT INCLUDED WITH THIS COPY, PLEASE CONTACT:

MR. ROBERT J. BLANCO , P.E.
CHIEF, ENVIRONMENTAL INPACT BRANCH
U. S ENVIRONMENTAL PROTECTION AGENCY
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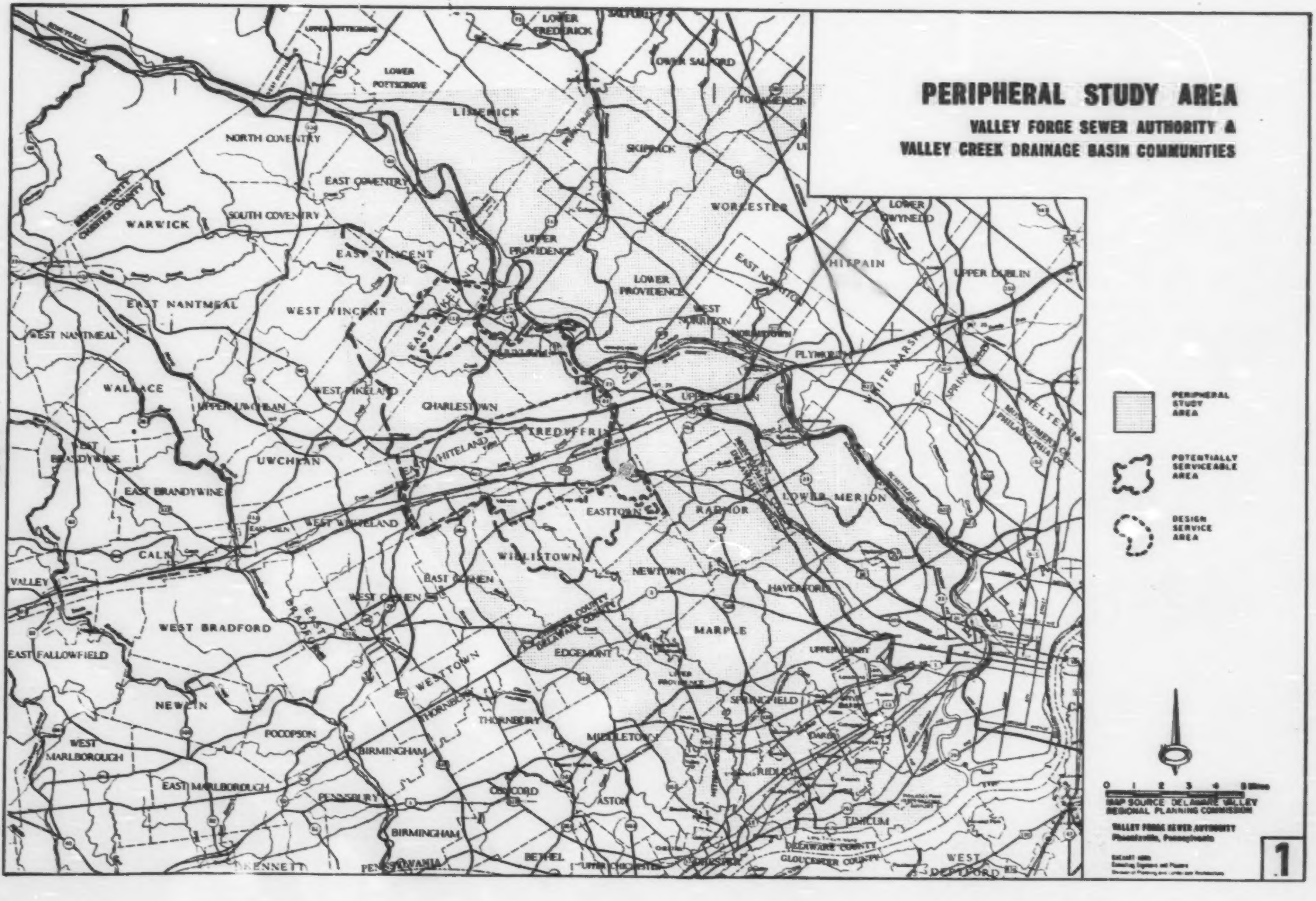

PERIPHERAL STUDY AREA

VALLEY FORGE SEWER AUTHORITY &
VALLEY CREEK DRAINAGE BASIN COMMUNITIES

PERIPHERAL STUDY AREA
POTENTIALLY SERVICEABLE AREA
DESIGN SERVICE AREA
0 1 2 3 4 5 Miles
MAP SOURCE DELAWARE VALLEY REGIONAL PLANNING COMMISSION
VALLEY FORGE SEWER AUTHORITY
Phoenixville, Pennsylvania
1
NORTH COVENTRY
EAST COVENTRY
SOUTH COVENTRY
WARWICK
LOWER POTTSGROVE
LIMERICK
LOWER FREDERICK
LOWER SALFORD
SKIPPACK
WORCESTER
UPPER PROVIDENCE
LOWER PROVIDENCE
EAST VINCENT
WEST VINCENT
EAST NANTMEAL
WEST NANTMEAL
EAST PIKELAND
WEST PIKELAND
CHARLESTOWN
UPPER UWCHLAN
UWCHLAN
WALLACE
EAST BRANDYWINE
WEST BRANDYWINE
TREDYFFRIN
EAST WHITELAND
WEST WHITELAND
EASTTOWN
WILLISTOWN
CALN
VALLEY
EAST GOSHEN
WEST GOSHEN
EAST BRADFORD
WEST BRADFORD
EAST FALLOWFIELD
NEWLIN
WEST MARLBOROUGH
EAST MARLBOROUGH
POCOPSON
BIRMINGHAM
PENNSBURY
KENNETT
PENNSYLVANIA
WESTTOWN
THORNBURY
EDGEMONT
NEWTOWN
RADNOR
LOWER MERION
HAVERFORD
MARPLE
UPPER DARBY
SPRINGFIELD
MIDDLETOWN
CONCORD
BETHEL
ASTON
RIDLEY
TINICUM
DELAWARE COUNTY
GLOUCESTER COUNTY
WEST DEPTFORD
WEST NORRITON
PLYMOUTH
WHITEMARSH
UPPER MERION
EAST NORRITON
WHITPAIN
LOWER GWYNEDD
UPPER DUBLIN
SPRINGFIELD
CHELTENHAM
MONTGOMERY CO.
PHILADELPHIA CO.
BERKS COUNTY
CHESTER COUNTY